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REPORT
OF
HARBOR AND LAND
COMMISSIONERS

1911

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THIRTY-THIRD ANNUAL REPORT

OF THE

BOARD OF HARBOR AND LAND COMMISSIONERS.

FOR THE YEAR 1911.



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The Commonwealth of Massachusetts.

REPORT.

To the Honorable the Senate and House of Representatives of the Commonwealth of Massachusetts.

The Board of Harbor and Land Commissioners, pursuant to the provisions of law, respectfully submits its annual report for the year 1911, covering a period of twelve months, from Nov. 30, 1910, being the thirty-third annual report of the Board since its establishment by chapter 263 of the Acts of 1879.

The present organization of the Board is as follows: George E. Smith of Swampscott, chairman, Samuel M. Mansfield of Boston, Charles C. Paine of Barnstable.

From Dec. 1, 1910, to Nov. 30, 1911, the Board has given 210 formal and informal hearings, and has received 194 petitions for the improvement and protection of rivers, harbors and foreshores, for licenses to build and maintain structures, for privileges in tide waters, great ponds and Connecticut River, to dredge material, to remove material from beaches, and for other purposes.

Ninety-three licenses for structures and privileges in tide waters and great ponds have been granted during the year; also 62 permits for dredging, for the removal of material from beaches, and for other purposes.

Inspections have been made at various times, by and under the direction of the Board, of work completed and in progress on the Commonwealth's Flats at South Boston; of sites of authorized work under appropriations made by the Legislature; also upon petitions and plans presented of the sites of proposed work in tide waters; rivers and harbors, on petitions for improvement under chapter 481, Acts of 1909; work done and in progress on the Cape Cod Canal; various structures built

under licenses; State boundary lines; town boundary survey work.

Through transactions of the Board there has been paid into the treasury of the Commonwealth during the year from rents, licenses, leases and other sources, and credited to the Commonwealth's flats improvement fund and the harbor compensation fund for Boston harbor, the aggregate sum of \$99,788.51. This does not include income from investments of the funds.

During the year 12 contracts were made, involving the estimated expenditure of \$151,003.83. A list of these contracts and those pending, with details relating thereto, may be found in the Appendix.

BOSTON HARBOR.

Chapter 748 of the Acts of 1911, approved July 28, 1911, authorized the appointment of a board to be composed of five members and to be known as the Directors of the Port of Boston, the chairman to receive an annual salary of \$15,000 and the other members an annual salary of \$1,000. By this act "All the rights, powers and duties now pertaining to the board of harbor and land commissioners in respect to such lands, rights in lands, flats, shores, waters and rights belonging to the commonwealth in tide waters and land under water as constitute that part of Boston harbor lying westerly and inside of a line drawn between Point Allerton on the south and the southerly end of Point Shirley on the north, or as adjoin the same or are connected therewith, and any other rights and powers heretofore vested by the laws of the commonwealth in the board of harbor and land commissioners in respect to any part of said area," were transferred to and vested in the new board. Furthermore, the directors were authorized and directed to "assume and take over on behalf of the commonwealth, any rights, powers and duties of the board of harbor and land commissioners under any contracts heretofore made for the improvement, filling, sale, use or other disposition of the lands, flats or waters of the commonwealth" within that portion of Boston harbor above described, "including any structures now existing or being built therein or thereon."

Section 3 provides that "The board of harbor and land com-

missioners shall deliver to the directors such maps, charts, plans and documents now in the custody of said board relating to the waters and lands in charge of the directors as may be practicable." It is also provided in section 19 that the provisions of section 1 in relation to the appointment of the directors, and the provisions of section 5 in relation to the approval of certain plans by the Harbor and Land Commissioners until the appointment and organization of the directors, shall take effect upon the passage of the act, and that the remaining provisions of the act shall take effect thirty days after its passage: "*provided, however, that the board of harbor and land commissioners shall continue to exercise all powers now vested by law in said board to the extent of taking action at any time within three months after the passage of this act upon any petition now pending before said board upon which a public hearing was held, or an order of notice of a public hearing was issued prior to the passage of this act.*"

The Powers and Duties of the Board of Harbor and Land Commissioners.

The Board of Harbor and Land Commissioners consists of three members appointed by the Governor with the advice and consent of the Council. The annual salary of the chairman is \$3,300, and the annual salary of each of the other two commissioners is \$2,700. The members are not required by law to devote their whole time to the work of the Board. A chief engineer whose salary is \$4,500 per year is employed, also assistant engineers, draftsmen and a clerical force.

The powers and duties of the Board, as defined in chapter 96 of the Revised Laws and other statutes, part of which are affected by the provisions of chapter 748 aforesaid, are to recommend legislation necessary for the preservation and development of the harbors and lands of the Commonwealth; to have charge of lands, flats, shores and rights in tide waters belonging to the Commonwealth; to ascertain the location, extent and description of such lands; to ascertain what part thereof have been granted by the Commonwealth, the conditions on which such grants were made, whether such conditions have been complied

with, what encroachments have been made, etc.; to ascertain what portions of such lands may be leased, sold or improved with benefit to the Commonwealth and without injury to navigation or to rights of riparian owners; to lease such lands; to make contracts for the improvement, filling, sale, use or other disposition of lands at South Boston known as the Commonwealth flats, to lease any portion thereof, to regulate the taking of material from the harbor and prepare a general plan of those lands whereon it shall designate the portions which should be devoted to railway and commercial purposes and those which should be devoted to general purposes; to have supervision of the Province Lands at Provincetown and protect and improve them; to have the general care and supervision of the harbors and tide waters of the Commonwealth, of the flats and lands flowed thereby, of the waters and banks of the Connecticut River in order to prevent and remove unauthorized encroachments and causes of any kind which may interfere with navigation. to protect and develop the rights and property of the Commonwealth in such flats and lands; to make necessary surveys, examinations and observations; to make surveys and improvements for the preservation of harbors and to repair damages occasioned by storms or other destructive agencies along the coast line or river banks of the Commonwealth, and to take land, etc.; to expend during the years 1910, 1911 and 1912, in its discretion as to locality, a sum not exceeding \$300,000 for the improvement and protection of rivers, harbors, tide waters and foreshores, — a delegation of authority formerly exercised by the Legislature; to apply to Congress for appropriations for the protection and improvement of any harbor in the Commonwealth; to remove wrecks and other obstructions in tide water; to supervise the transportation and dumping of material dredged in tide water; to prevent the unauthorized removal of material from beaches, headlands, islands, etc.; to make contracts for the filling, improvement and use of land and flats near Jeffries Point at East Boston taken by the Commonwealth under authority of chapter 486 of the Acts of 1897; to dredge in Boston harbor wherever the public convenience and necessity require, upon such plans as the Board may adopt; to have the management

of all the wharves, docks and foreshore owned by the Commonwealth in Boston harbor and not otherwise provided for, and to lease parcels thereof for not exceeding fifteen years; to prescribe harbor lines in any harbor of the Commonwealth and report them to the Legislature for action thereon; to approve plans for and supervise the erection of structures in tide waters, great ponds and Connecticut River; to license the construction or extension of wharves, piers, and the filling of land and flats in tide water, great ponds and Connecticut River; to require compensation to be made for tide water displaced by work done under licenses; to expend the income of the harbor compensation fund for dredging, this fund being made up from amounts paid to the Commonwealth for tide-water displacement; to recommend to the Governor and Council the amount which should be paid for rights and privileges granted in tide-water land of the Commonwealth under licenses issued by the Board; to make surveys and investigations for the purpose of determining the location of boundary lines of cities and towns, and to prepare and print town boundary atlases; to approve certain plans of the Cape Cod Canal, and to have jurisdiction thereof when completed, and, acting with the Railroad Commissioners, to determine and approve important matters connected with plans, crossings, issue of stock and bonds, etc.

Work accomplished in Boston Harbor.

Dredging. — As has been stated in previous reports, dredging in Boston inner harbor has been done by the State largely between the areas properly belonging to the general government for improvement and a line 50 feet beyond established harbor lines, work having been practically commenced, under authority of an act passed in 1874, by dredging a portion of Junction Shoal off Constitution Wharf to a depth of 23 feet at mean low water.

From 1874 to 1900, inclusive, excavation to the amount of 3,502,856 cubic yards was made in Fort Point Channel; along the main city frontage; at the South Boston flats; opposite the National Docks and Grand Junction Wharves at East Boston; opposite the Hoosac Tunnel Docks and Mystic Wharf; at Bird

Island Shoal; and at other places, to depths ranging from 12 to 27 feet at mean low water.

By chapter 476 of the Acts of 1901 the Board was authorized and directed to excavate a basin and to build and maintain structures in Boston harbor, northerly of the main ship channel, for the purpose of providing mooring facilities and additional anchorage ground. The expenditure of \$1,000,000 was authorized by this act, and up to 1909 dredging to the amount of 3,081,853 cubic yards had been done, providing a basin along the northerly side of the main ship channel covering an area about 1 mile in length and 1,000 feet wide, equivalent to about 126 acres, in which there was a depth of 30 feet at mean low water. Between 1901 and 1910, inclusive, dredging in addition to that previously stated was done in various places in Boston harbor and its tributaries, among which may be mentioned the following: the approach to the Cunard Pier at East Boston to a depth of 35 feet at mean low water over an area of about 4 acres, at a cost of about \$21,600; the westerly end of Bird Island Shoal to a depth of 12 feet at mean low water over an area of about 11.43 acres, the amount of excavation being about 184,073 cubic yards and the cost about \$43,700; the Reserved Channel at South Boston to a depth of 20 feet at mean low water, the amount of excavation being 505,852 cubic yards and the cost about \$85,650; opposite India Wharf over an area 550 feet long and 300 feet wide to 23 feet at mean low water, the amount of excavation being 16,953 cubic yards and the cost \$4,746.84; at Winthrop an anchorage basin 6 feet deep at mean low water over an area 380 feet long and 160 feet wide, the amount of excavation being 20,000 cubic yards and the cost \$4,638.83; in Old harbor, two anchorage basins to depths of 6 feet and 9 feet, respectively, at mean low water, the amount of excavation being 508,414 cubic yards and the expenditure therefor \$100,239.96; in Dorchester Bay between Savin Hill and Commercial Point, to provide a channel 12 feet deep at mean low water and an anchorage basin 9 feet deep at mean low water, the total excavation being 323,454 cubic yards and the cost \$70,171.31; in Neponset River, from the Neponset highway bridge to the railroad bridge at Milton Mills, to a

depth of 6 feet at mean low water, also an anchorage basin, at a cost of \$34,269.70; in Weymouth Fore River to provide a channel 200 feet wide and 15 feet deep at mean low water, extending from Quincy Point bridge down stream about 1,850 feet; also three areas in the upper portion of this river; opposite the Commonwealth Pier and terminal of the New York, New Haven and Hartford Railroad Company at South Boston; opposite Union Wharf and the South Ferry.

During the year ending Nov. 30, 1911, additional dredging has been done, as follows:—

In Mystic River, south channel: On July 1, 1910, a contract was entered into with the Eastern Dredging Company to dredge to 20 feet at mean low water a portion of the south channel of this river below and above Chelsea bridge, south, the portion below this bridge being about 950 feet long and 85 feet wide, and that above the bridge 1,850 feet long and 110 feet wide. The contract price was 14 $\frac{7}{10}$ cents per cubic yard, measured in scows. This work was completed Jan. 19, 1911, material to the amount of 103,511 cubic yards having been dredged and deposited at sea at a cost of \$14,698.56.

On Nov. 18, 1910, a contract was entered into with the Bay State Dredging Company to dredge to 20 feet at mean low water an area of about 88,800 square feet in this river, above Chelsea bridge, south. The contract price was 18 cents per cubic yard, measured in scows. This work was completed Jan. 10, 1911, material to the amount of 46,560 cubic yards having been dredged and deposited at sea at a cost of \$8,380.80.

Payment for work done under these two contracts was made from the income of the harbor compensation fund.

The amount expended during the year is \$12,384.31.

The total amount expended for the improvement of the south channel of Mystic River, to Dec. 1, 1911, is \$24,253.67.

Opposite Leyland Line Pier: On March 31, 1911, a contract was entered into with the Daly & Hannan Dredging Company of Ogdensburg, N. Y., for dredging to 35 feet at mean low water an area opposite the Leyland Line Pier of the Grand Junction wharves at East Boston, from 500 to 800 feet wide and an average length of about 1,100 feet, extending from a

line 50 feet outside the harbor line to the main ship channel dredged by the United States. The contract price was 25 cents per cubic yard, measured in scows. This work was completed July 12, 1911, material to the amount of 239,119 cubic yards having been dredged and deposited at sea at a cost of \$59,779.75, to be paid for from the income of the harbor compensation fund.

The amount expended during the year is \$41,380.72.

Opposite Pier No. 6 at South Boston: Under a contract with the Eastern Dredging Company, dated Oct. 22, 1909, the area lying between the main ship channel dredged by the United States and the United States harbor line, and opposite Pier No. 6 at South Boston now under construction by the Commonwealth and to be used for the fish industry, the terms of an agreement and lease respecting this pier being stated later in this report, has been dredged to 23 feet at mean low water. Work was completed Aug. 9, 1911, material to the amount of 97,495 cubic yards having been excavated at a cost of \$14,916.74. The contract price was $15\frac{3}{10}$ cents per cubic yard measured in scows. Payment for this work was made from the Commonwealth's flats improvement fund.

For dredging done in Old harbor, Hingham harbor, near Hough's Neck in Quincy, and Winthrop harbor, see pages 60, 68, 57 and 51.

The following information in respect to dredging operations in Boston harbor by the United States government, under charge of Col. Frederic V. Abbot, Corps of Engineers, U. S. A., has been furnished by him upon request, and is in addition to the statement of that officer printed in this report on pages 86 and 87.

Project of June 13, 1902: To provide channels 35 feet deep at mean low water, 1,200 feet wide from the Navy Yard at Charlestown and the Chelsea and Charles River bridges to President Roads, and 1,500 feet wide from President Roads through Broad Sound to the ocean.

1. Three of the four contracts entered into for dredging authorized by act of Congress dated June 13, 1902, have been completed and one is still in force. These four contracts embrace the dredging of 9,780,000 cubic yards, and on Dec. 1, 1911, 9,563,779 cubic yards had been dredged. A channel 540 feet wide from the Navy Yard and the bridges to President Roads, and 675 feet wide thence to the sea, had been dredged, through which a general depth of 35 feet at mean

low water existed, but the channel from the Navy Yard to President Roads was obstructed by a few small shoals yet to be removed to complete the contract still in force. All ledges obstructing these channels had been removed except a few small points on the south side of the channel, which will be taken out in connection with the removal of other ledges during the coming year.

2. On Dec. 1, 1911, 11,733,669 cubic yards had been dredged under contracts authorized by act of Congress dated March 2, 1907, practically completing the contracts, except for some cleaning up of small areas where the full depth had not been quite secured. This cleaning up will doubtless be completed by Dec. 31, 1911. On that date a channel 35 feet deep at mean low water, 1,200 feet wide from the Navy Yard and the bridges to President Roads, and thence 1,500 feet wide to the sea, will have been completed, so far as soft material, capable of removal by dredges, is concerned. There will remain to be removed a few scattered points of ledge in the Broad Sound part of the new channel, and a large volume of rock on both sides of a straight inner channel now 35 feet deep and 450 feet wide, extending from a point about half way between Governors Island and Spectacle Island to a point a little to the westward of the outer end of the Commonwealth Dock. A contract has been let for removal of all ledges to the south of this channel which lie within the limits of the proposed 35-foot channel. Surveys on which to base a contract for removing all ledges to the north and lying within the limits of the proposed 35-foot channel have been completed, and the contract will be advertised early in the spring of 1912.

As the dredging has been in progress for nearly eight years, it is known that some local shoaling has occurred in the parts first completed, and it is likely that leakage from passing loaded scows may have made other small local obstructions within the limits of the full width of 1,200 and 1,500 feet projected.

In the spring, when weather is suitable for accurate surveys, the whole area will be carefully examined and such obstructions removed.

All of the dredging operations by the State in Boston harbor and its tributaries, as specified herein, were based on surveys and plans prepared under the direction of the Board, and represent an expenditure by the Commonwealth between 1874 and 1911 inclusive, of approximately \$2,900,000 to facilitate navigation generally and to enable steamships of great draft to reach their piers and docks. This work has been done from time to time to meet the demands of commerce and to supplement work done by the general government.

The expenditure by the United States for dredging in Boston harbor and its tributaries, including construction and repair of sea walls for the preservation of the channels in the harbor, within the same period, has been about \$10,000,000. The amount of dredging done by the city of Boston between 1883 and 1906 was approximately 101,000 cubic yards, which was largely in connection with its own property. The city should be credited with action as early as the year 1859 in obtaining the appointment of a special commission by the general government, composed of officers detailed for the purpose of making a survey and examination of Boston harbor, followed by reports of this special commission embodying the results of its surveys and examination made at the expense of the city.

The Commonwealth's Flats at South Boston.

This territory, on the south side of Boston inner harbor, as originally contained in the project of development by the Commonwealth comprised about 750 acres. The plan was for a harbor improvement and health measure, and not as a land speculation. and was approved and adopted by the Legislature in 1866. In 1873 a contract for structures and filling on that portion of these lands now owned or controlled by the New York, New Haven & Hartford Railroad Company, and located at the junction of Fort Point Channel and the main harbor, was approved, and the work of reclamation and improvement commenced.

In 1880 a very important statute was passed, which gave authority to the New York & New England Railroad Company to purchase from the Commonwealth for \$1,000,000 the tract of land mentioned in the previous paragraph; also to purchase another parcel of land and flats located southerly of Congress Street, formerly Eastern Avenue. In this year the Boston & Albany Railroad Company, which had some ten years previously purchased of the State about 50 acres of flats lying easterly of the parcel at the entrance to Fort Point Channel previously described, after paying the State \$330,000 on account of the purchase, assigned, with the assent of the Commonwealth, all its right in this 50 acres to the New York & New England

Railroad Company, which agreed to assume certain obligations in respect to filling, etc., and to pay the further sum of \$100,000.

Deeds of these three parcels, executed by this Board and approved by the Governor and Council, were given to the New York & New England Railroad Company in 1889. It is important to bear in mind: (1) That the smallest in area of these three parcels was located south of Congress Street and the other two parcels north of that street. (2) That to fully utilize these two northern parcels as a railroad terminal it was necessary for the railroad company to lay tracks across this street, and this was done at grade, at one time as many as twenty being thus laid. (3) That the remaining land and flats of the State was adjacent to and easterly of the railroad property, and that access thereto was by Congress Street only, and the State's holdings were practically bottled up so far as reasonable access thereto by land was concerned.

The necessity for another way to the Commonwealth's flats in addition to Congress Street was recognized by the State as early as 1866, and the construction of Northern Avenue north of Congress Street, and a bridge connecting the city proper and South Boston, was contemplated in 1873 under an agreement by the terms of which the Commonwealth, the city of Boston, the Boston Wharf Company and the Boston & Albany Railroad Company were to begin the development of the territory known as the South Boston flats. This Board repeatedly called attention in its annual reports to the necessity for action in respect to this means of access, and in 1901, by chapter 507 of the Acts of that year, this avenue was laid out, it being provided that the act should take effect upon its acceptance by the city council of Boston. No action having been taken by the city council, the Board requested early consideration, stating in a letter to the mayor that under the agreement of 1873 "the benefit to the city has been the creation of land of the present assessed valuation of over \$10,000,000, from which the city derives a portion of her taxes, also 100 acres additional remaining to be sold by the Commonwealth, and which will be taxed by the assessors of Boston;" and that fulfillment of the obligations under the agreement "will give additional value to the Commonwealth's water

front, and provide increased facilities for and accommodation to the commercial interests of the port."

The city failed to accept this act, and the Board again, in 1903, urged action by the Legislature, resulting in the passage of chapter 381, Acts of 1903, providing for the laying out and construction of Northern Avenue and bridge across Fort Point Channel and the land of the New England Railroad Company and of the Commonwealth; also for laying out a street connecting this avenue with Congress Street, the Commonwealth to pay to Boston \$260,000 in part payment of the cost of this work. This bridge was opened to travel in 1908 and the avenue is now built to the line of the Commonwealth's property and is under construction to a point about 450 feet easterly from the east line of the pier under construction by the State for the fish industry.

Thus there was a delay of many years in providing means of direct access to this large territory adequate to its utilization as a terminal for maritime and railroad purposes, — a delay which can be attributed to a great extent to the adverse attitude of the railroad company and the city of Boston.

Commonwealth Pier.

For the purpose of showing clearly the basis for action by the State in building the Commonwealth Pier, reference is made to the report of the State Board on Docks and Terminal Facilities to the Legislature in 1897. This special Board was appointed under chapter 291 of the Acts of 1895, which provided for an investigation of the wants of the port of Boston for an improved system of docks and wharves, and terminal facilities in connection therewith. After an exhaustive study of this subject, and an investigation of the principal harbors and pier and dock systems in this country and in Europe, and of the question of public ownership and control of docks, and wharves and terminal facilities, this special Board recommended in its report "that a model pier and dock, with every modern appliance needed for the economical and speedy handling of cargoes at this port, be forthwith built on the Commonwealth's flats at South Boston, with a view to meeting the demand for such additional

accommodation; and that when built, the same, if wanted for exclusive use, be leased for a term not exceeding fifteen years; and when so leased, or fully occupied, another such dock be built, answering to the requirements of the then period, — and so on, as long as the demand shall continue. And if, meanwhile, a demand for a wharf or other improvement in the East Boston tract or in the Dorchester Bay tract shall arise, for foreign or domestic purposes, that then such improvement as may be wanted shall be made. In this way, it is believed, the advantages of public ownership as elsewhere demonstrated may be acquired and retained at this port, for the benefit of the present generation and posterity, at a minimum cost.”

Among the various subjects which this special Board was directed to consider and investigate was the following: If public ownership of a system of docks and wharves in Boston is advisable, in what manner can the necessary water front best be acquired, and who or what authority or agency should have charge of the construction of new docks, and the maintenance of the system when in operation.

As to what authority or agency should have charge, this special Board said: —

The objection to creating another commission to accomplish work the nature of which is quite in line with that already performed by an established commission is obvious. The subordinate duties involved in such a work can be systematized, classified and carried on by skilled and qualified agents to an indefinite extent. The more completely correlated subjects can be brought under one head the more stable and consistent will be the policy and the more uninterrupted and economical the work incident thereto. The evils of divided jurisdiction are too well known to require argument.

The Board of Harbor and Land Commissioners already have jurisdiction over tide waters and harbors, as well as over great ponds and the Connecticut River. They have in charge the improvement of the Commonwealth South Boston flats, upon which the building of docks has for some time been contemplated. That Board also is the one best fitted, by virtue of the maps, plans and information gained in connection with the general work of its office, to deal with the questions which are likely to arise in carrying on the proposed works. The office of the Board is, moreover, at all times easily accessible to the public for the purpose of lodging complaints, or inviting consideration to any changes in rules and regulations which business interests may re-

quire. For these and other cogent reasons this Board, after the most careful consideration, is of the opinion that the most economical, effective and satisfactory body to perform the functions herein suggested is the Harbor and Land Commission.

The Legislature, acting upon the recommendations in this report, by chapter 513 of the Acts of 1897 directed the Board of Harbor and Land Commissioners to construct the pier, known as the Commonwealth Pier, and a dock, on the northerly frontage of the Commonwealth's flats at South Boston, and appropriated \$400,000 therefor. This pier was completed in 1901 at a cost of \$381,877.09, and is 1,200 feet long and 400 feet wide, with a dock of the same length as the pier on the westerly side, now dredged 175 feet wide at the outer end, 200 feet wide at the inner end and 30 feet deep at mean low water. The dock on the easterly side of this pier, also an area opposite this dock and the pier and lying between the pier and bulkhead line and the channel improved by the United States government, have been dredged by the State to a depth of 35 feet at mean low water. The total area of the pier is about 11 acres and it was constructed with a view to allowing an increase in the depth of the docks, if desired in the future, to 40 feet at mean low water, without endangering the structure. Practically no use was made of this structure after its completion, and in 1910, with the approval of the Governor and Council, it was leased, together with the two adjoining docks and 597,177 square feet of land lying between Summer Street and Northern Avenue, to the Old Colony Railroad Company for a term of thirty years, beginning Dec. 1, 1910, the rental being at the rate of \$70,000 per annum. No use of this pier has thus far been made by the railroad company and no structures have been erected thereon.

In reference to access to the Commonwealth Pier, and to its equipment for use, it may be stated that as early as 1898 this Board reported to the Legislature that when completed it would be necessary "to erect such buildings on the surface as the nature of the business to be transacted there may need for its accommodation. This will depend somewhat upon the character and requirements of the lessees. Suitable railroad tracks, laid upon the pier and located so as to make it a terminal connect-

ing with the different railroad systems entering Boston, will become necessary."

At this time the Board had assurances that justified it in saying "that a contract for a satisfactory lease covering a period of fifteen years could have been executed had the Board been in a position to promise such access as the requirements of business there will make necessary, and such as has been in contemplation by the Commonwealth and the city of Boston ever since the first project for developing this territory was promulgated, more than a quarter of a century ago."

Again, in its report for 1899, it was stated that the Board felt confident that a lease of the whole of this pier could have been contracted for before its completion if the construction of an approach by way of Northern Avenue and bridge had been assured.

In its report for 1900 it was stated that plans and estimates could not be made for the erection of such sheds and other buildings on this pier as may be required until it was definitely known to what uses the pier was to be put.

Again, in its report for 1901, "a number of applications have been made during the year to use the pier for tying up and discharging vessels, but the inaccessibility of the location from the land has prevented the making of any satisfactory arrangements for permanent use."

In the report for 1907, "The Commonwealth Pier might be equipped with sheds, warehouses, railroad tracks and hoists if only some one could indicate the use to which the pier would be put. Sheds sufficient for cheap bulk freight would not answer for storage of valuable cargo. Various things are left in doubt until a use is indicated or a tenant discovered."

The fact that there existed on the main channel of Boston harbor a pier of such ample dimensions, capable of accommodating the largest steamships afloat, and that a tenant or occupant was desired therefor, was known for years to the steamship companies, and representatives of several of them were interviewed by members of this Board with a view to inducing them to take a lease from the State, but no one was willing to enter into a lease, although one company, whose terminal was, and is to-day,

inadequate for its needs, expressed tentatively its appreciation of the value of this location, particularly as a terminal for the accommodation of its passenger travel, provided proper sheds were erected and access to the pier made direct and easy from Summer Street.

At this point it seems necessary, for the purposes of a clear understanding of the situation in 1910 and 1911 in respect to the future development of the port of Boston, — a subject which has been so widely discussed by commercial bodies and others, resulting in the passage of the so-called Port Bill of 1911, — to call attention to certain portions of the two reports of the Joint Board, composed of the members of the Board of Railroad Commissioners, the Boston Transit Commission, the Metropolitan Park Commission and the Board of Harbor and Land Commissioners, acting under authority of chapter 113 of the Resolves of 1909, which reports were made, as stated therein. in pursuance of the Joint Board's understanding that it was the intention of the Legislature that it should supplement the work of the Metropolitan Improvements Commission by selecting and advancing such of its suggestions and adding such others as seemed to call most strongly for immediate and definite action.

The Joint Board said, in its preliminary report of Jan. 1, 1910, that "the only subjects upon which immediate action by the Legislature seems to this Board necessary or desirable are those hereinafter set forth," which were, so far as Boston harbor was concerned, the East Boston Flats and the Commonwealth Flats at South Boston. Upon this last subject it was reported that: —

The Commonwealth flats at South Boston are already filled to about grade 14, and ready for rapid development. The main ship channel in front of the pierhead line is completed. The Commonwealth Pier is constructed, with a berth of 30 feet at mean low water on the west-erly side, and soon there will be 35 feet on the easterly side, and on both sides of the pier a depth of 40 feet can be provided.

This large pier, with a surface of 11 acres, is awaiting a tenant. Other piers 1,200 feet in length can be built as soon as there is a demand therefor. An elevated highway or viaduct can be built from

Summer Street at C Street across land of the Commonwealth to the second story of the sheds on the pier. Such a roadway would enable passenger traffic on foot and in carriages to reach the second story of the pier sheds by a safe, convenient and level roadway, and would leave Northern Avenue, connecting at grade with the same piers, entirely for the use of freight and passenger trains and heavy trucks. The freight would be loaded, discharged and carried away on the lower level, while the passengers and baggage would arrive and depart directly on the upper level, without any crossing of railroad tracks at grade.

There are over 90 acres of filled land belonging to the Commonwealth on the northeasterly side of Summer Street ready for use, either for warehouses, car sheds or a freight yard. The Commonwealth also owns over a mile and a half of frontage on the pierhead line of the main ship channel and the Reserved Channel, all of which may in time, if there is a demand, be developed with piers and berths. It is sufficient to say that this is likely to meet the demands of navigation and commerce on this side of the harbor at least for many years.

This Board recommends that sufficient money be appropriated out of the Commonwealth's flats improvement fund to enable the Board of Harbor and Land Commissioners to construct new piers along this front and otherwise develop the Commonwealth flats, as soon as it is reasonably certain that they can be rented to steamship lines or others at a proper rental, to be approved by the Governor and Council.

This Board approves the policy heretofore pursued, of holding the flats and foreshore in public ownership both in South Boston and East Boston for development in a large way for purposes of general public importance to navigation and commerce, and recommends that this policy be continued in the future.

In furtherance of the recommendations contained in this report the Legislature passed chapter 586 of the Acts of 1910, providing further for the improvement of the Commonwealth's flats at South Boston, and appropriating \$1,000,000 from the Commonwealth's flats improvement fund, established by chapter 237 of the Acts of 1878 for the purpose of enforcing and executing the provisions and requirements of laws relating to these flats, and for the payment of money which may be needed to carry out the provisions of chapter 239 of the Acts of 1875, — this act of 1875 containing the authority vested in the Harbor and Land Commissioners to make contracts for the improvement, filling, sale, use or other disposition of this territory.

Under the general authority conferred by the act of 1875, referred to above, and after the passage of the act of 1910 carrying the appropriation of \$1,000,000, the Board of Harbor and Land Commissioners, in behalf of the Commonwealth, as stated in detail in its report for 1910, after negotiations and many conferences, entered into an agreement with the Boston Fish Market Corporation providing for the construction by the State of a pier, next easterly of the Commonwealth Pier, 1,200 feet long and 300 feet wide, extending from Northern Avenue to the United States Pier and bulkhead line, and for docks on the northeasterly and southwesterly side of said pier dredged to 23 feet at mean low water, and for dredging an approach to this pier and doing other work. This agreement contemplates the erection of buildings on the leased premises and the carrying out of other improvements by this corporation costing not less than \$400,000. A further provision was the execution, concurrently with the execution of the agreement, of a lease between the parties, the same to be delivered in escrow, and to take effect and to be turned over to the Commonwealth and the corporation upon the performance of the conditions of the agreement, exclusive of the postponed work of certain repaving.

The Board directed its chief engineer to confer with the parties representing the corporation and to prepare plans and specifications for building a pier consisting of solid filling with stone walls to retain the same, to meet the demands of the fish industry, and provide for the necessary dredging to permit the use of the pier for carrying on this important line of business. The work was advertised, proposals were received in September, 1910, and a contract entered into with the Holbrook, Cabot & Rollins Corporation, the contract price being \$760,000, which included the building of the pier, the construction of a light sea wall 645 feet in length along the northeasterly side of Northern Avenue, and dredging and a part of the other work required by the agreement with the corporation.

The lease, covering in addition to the pier an area of 177,100 square feet of land adjoining the southwesterly side of Northern Avenue, as executed by the parties and approved by the Governor and Council on Sept. 28, 1910, is for a term of fifteen years, beginning Oct. 1, 1913, the annual rental being \$35,000,

with the right in the lessee to extend the lease for a further period of fifteen years from Oct. 1, 1928, on the same terms and conditions, except that the annual rental for the additional term shall be at the rate of \$45,000, the lessee during the term of the lease or extension thereof to pay the annual municipal taxes.

Work under this contract has been in progress throughout the year. The laying of stone in the side walls was commenced in February, 1911, and 61 per cent. of the stone masonry has been completed. The total amount of work done up to Dec. 1, 1911, makes the total value of the work done 62 per cent. of the total cost of the pier. By the terms of the contract all work is to be completed by Jan. 1, 1913.

It is submitted that this development, now in progress, on the part of the Commonwealth is in furtherance of a project of providing additional facilities at the port of Boston to enable a corporation which has made known in advance the requirements of its particular business, and which is willing to enter into a lease with the State at a fair rental for the rights and privileges thereunder, to proceed with its plans for occupation and use, that it is founded on sound and conservative business principles, and is in line with the recommendations of the Joint Board aforesaid.

Piers and wharves other than the two piers particularly mentioned above, but much smaller in area, have been built at South Boston easterly of the present railroad terminal, under the direction of this Board, and have been leased, together with filled land and certain rights and privileges in dredged berths and channels, as follows:—

On the northerly frontage: Pile wharf, covering an area of 16,900 square feet, together with rights and privileges in dredged channel and berths, and 275,800 square feet of land, to the Metropolitan Coal Company. Pile pier, covering an area of 21,550 square feet, together with rights and privileges in dredged channel and berths, and 267,320 square feet of land, to the Staples Coal Company. Pile wharf, covering an area of 20,000 square feet, together with rights and privileges in dredged channel and berths, and about 249,287 square feet of land, to the Boston Molasses Company.

On the Reserved Channel: Pile wharf, covering an area of

9,942 square feet, with 74,971 square feet of land, to the Staples Coal Company. Pile wharf, covering an area of 15,000 square feet, together with rights and privileges in an approach channel and dredged berths, and 1,136.75 square feet of land, to the Grasselli Chemical Company of Massachusetts.

The construction of all of these piers and wharves, as well as the necessary dredging to make them accessible for commercial uses, was, as in the case of the pier for the fish industry, the result of preliminary negotiations and conferences between the Board and the prospective lessees.

The possibilities for future development of the holdings of the State at South Boston as a water and railroad terminal are set forth in the last annual report of this Board, which shows by the map therewith sufficient territory for the construction of eleven large piers with docks of from 900 to 1,200 feet in length on the northerly frontage; also ample space for building smaller piers and docks on the south side adjoining the Reserved Channel, whenever appropriation therefor is made. All these structures, when built, could be connected with the New York, New Haven & Hartford Railroad, — which has had a track on these lands since 1896, — and, at reasonable expense, with other railroads entering Boston.

The area of all the land and flats at South Boston east of B Street and the 50-acre lot, sold by the Commonwealth between 1880 and Dec. 1, 1911, is 1,277,619 square feet, or 29.33 acres.

The area of filled land now owned is as follows: northerly of Summer Street, exclusive of pile piers, but including the filled portion of the Commonwealth Pier and fish pier. 4,760,234 square feet, or 109.28 acres. Of this area, 2,271,564 square feet, or 52.15 acres, are under lease, as previously stated. The area southerly of Summer Street, exclusive of streets, is 1,896,151 square feet, or 43.5 acres, of which 76,107 square feet, or 1.74 acres, are under lease, and 304,560 square feet, together with 47,000 square feet in two cross streets, or 8.1 acres in all, are used temporarily as a public playground, under authority of chapter 421 of the Acts of 1891.

East Boston Flats.

The East Boston Company, chartered by the Massachusetts Legislature in 1833, issued in 1894 a pamphlet, illustrated with elaborate maps, including one of Boston inner harbor, showing the property of this company on the easterly side of East Boston and proposed harbor front improvements on its property which it was stated at that time comprised 800 acres of available upland, flats and water front capable of development for terminals, elevators and warehouses for railway and steamship companies, both for domestic and foreign commerce.

In this publication was set forth what Liverpool and other large ports had done and were doing for improvement of port facilities, and what Boston can and should do for the improvement and development of its harbor. This pamphlet had wide circulation and excited considerable interest in the subject of harbor improvement, in the question of public and private control of the water front, and in the question of ways and means for establishing an improved system of docks and wharves and terminal facilities in connection therewith.

In this same year a committee of the city council of Boston made a report, submitted a plan for a system of docks and wharves, and recommended an order that the mayor petition for "such legislation as may be necessary for the establishment of a modern dock system, under public ownership, in Boston harbor." This action was followed by petitions of the Boston Merchants Association and others, looking to the passage of legislation for an investigation of this matter. The result of united efforts was the passage of chapter 291 of the Acts of 1895, which provided for the appointment of the special Board referred to in that portion of this report relating to the Commonwealth's flats at South Boston. One conclusion of this special Board, as stated in its report, made in 1897, was that a controlling quantity of the foreshore or water front should be permanently held by the Commonwealth. As to the accommodations for shipping and the needs of commerce, that Board was of the opinion that the Commonwealth's flats and Dorchester Bay were sufficient for the south side of the harbor, but that the accommodations on the

north side were inadequate. After a discussion of conditions on the East Boston frontage north of Jeffries Point, this special Board announced its conclusions in respect to the East Boston flats, and made a recommendation that it would be wise for the Commonwealth to reclaim the ownership in certain flats there located, not owned by the city of Boston, and that this area would "give ample accommodation for piers and docks, and at the same time leave in the rear of and abutting on the same a strip of territory sufficient for the purposes required, as incident or accessory to the use to which the premises are to be devoted. This belt we deem to be a sufficient reclamation, for some time to come, of the foreshore on the north side of the harbor."

By chapter 486 of the Acts of 1897 the Legislature, acting upon this recommendation, authorized the Harbor and Land Commissioners to take by purchase or otherwise, for the purpose of securing public ownership and control, certain parcels of land and flats on the easterly side of East Boston from an area bounded southwesterly by the southwesterly side line of Sumner Street extended; southeasterly by the United States pierhead line; northeasterly by the flats owned by the city of Boston and appurtenant to Wood Island Park; northwesterly by a line parallel with and 1,500 feet inside of or shoreward from said pierhead line, and appropriated \$100,000 to meet the expenses incurred. The act further provided that this Board might make contracts for the filling, improvement and use of the land and flats taken, upon such plans as it might deem best; should have power to excavate channels and dredge material in the harbor; should have charge and management of all the wharves, docks and foreshores owned by the Commonwealth and not otherwise provided for, and might from time to time lease the same in parcels, improved or unimproved, for periods not exceeding fifteen years. It is evident from the amount of the appropriation that not even one pier of sufficient dimensions to accommodate large steamers could have been built here.

The largest parcel of flats authorized to be taken was owned by the East Boston Company. In 1897 negotiations

were opened with this company for the purpose of ascertaining the valuation which was put upon the tract proposed to be purchased. As a price could not be agreed upon some of the more valuable small parcels of flats near the end of Jeffries Point, not owned by this company, were then purchased, at the rate of $2\frac{1}{2}$ cents per square foot. In 1898 a taking was made, under the statute, covering a tract of about 100 acres, which included property of the East Boston Company amounting to about 40 acres.

Thus the Commonwealth fourteen years ago owned in South Boston about 470 acres, and in East Boston had taken 100 acres more, making a total of about 570 acres, sufficient for the construction in this harbor of 15 large piers to meet the demands of commerce for a great many years.

The proceedings of this Board, as well as its suggestions and recommendations concerning the development of this territory, and the peculiar railroad conditions surrounding this section of the East Boston frontage, and litigation with the East Boston Company still pending, have been fully reported to the Legislature by this Board every year during the period 1898–1911. It may be of interest to call attention here to the following facts: —

In 1900 this Board reported that it was its duty “to emphasize what it has before said, that the value of the flats taken lies in their development in connection with railroad terminals;” that “plans should be carefully matured ready for development whenever the Legislature shall see fit to make an appropriation for the purpose;” that a change of location of railroad tracks in East Boston, as recommended by the special Board on Docks and Terminal Facilities, should be carried out, — these changes involving “the surrender by the Boston, Revere Beach & Lynn Railroad of its location between its East Boston ferry slip and Trumbull Street to the Boston & Albany Railroad and the Boston & Maine Railroad, and the surrender of the locations of the two last-named railroads from the junction of Bennington and Trumbull streets south to Marginal Street;” also “the acquisition of the last-named locations by the city of Boston for a boulevard, and the granting of the Boston, Revere Beach &

Lynn Railroad a location thereon, upon its adopting the use of electricity for motive power." . . . "A single glance at the map shows the increased water front areas which would be served by such a change. It would locate the tracks of the two great railroads near to the rear boundary of the Commonwealth flats, which have a frontage on the pierhead line of about 4,000 feet, with a depth of 1,500 feet, and include about 100 acres. This dedication by the Commonwealth of another large section of water front to the growing demands of commerce is a sagacious realization of opportunity; but it needs to be followed up by legislation requiring the foregoing changes to be made, in order to reap the advantages offered by the situation; otherwise the improvement of the territory acquired, by preparing it for the cheap handling of merchandise and products of all kinds in transit from railroad cars to vessels' bottoms and *vice versa*, would be liable to be visionary and profitless. Should the proposed change be made, it would become necessary to dredge a ship channel from the water front of the newly acquired flats to deep water, of a depth sufficient for the largest steamships now using this port, and for that purpose the Board would recommend not less than 35 to 40 feet.

"There are various ways in which the East Boston acquisition might be advantageously handled. All plans therefor would necessarily include deep-channel approaches. The Board has several studies under consideration, but, until the location of the tracks of the railroads is settled, and while the determination of damages for the taking is pending, it is obviously unadvisable to promulgate a matured project. In any plan of development, however, a sea wall or bulkhead would first be required."

In 1900 the suit for damages for taking flats of the East Boston Company was still pending. Reference was made in the report for this year to chapter 468 of the Acts of 1900, authorizing the lease of the Boston & Albany Railroad to the New York Central & Hudson River Railroad Company, particularly to section 6 of that act, which required the lessee to expend not less than \$250,000 in each year, beginning not later than July 1, 1901, until \$2,500,000 has been expended, in extending, enlarging, improving and developing the terminal facilities of the

lessor in East Boston and upon the Grand Junction Railroad, and for approaches to the property taken by the Commonwealth at East Boston for the purpose of constructing thereon wharves and docks. Further, in this report it was stated that "When definite action shall be taken with reference to this authorized expenditure, it is to be hoped that the improvement will result in locating the tracks of the Boston & Albany Railroad and the Boston & Maine Railroad over upon the east side of East Boston, at or near the location of the Boston, Revere Beach & Lynn Railroad, as has been outlined in prior reports of this Board, and provided for in chapter 462 of the Acts of 1900.

"Until plans shall be definitely matured by the railroad company with reference to the relocation of its tracks in East Boston, it would be premature to formulate plans for the development of the East Boston flats of the Commonwealth."

In the report for 1901, — that the claim of the East Boston Company still remained unsettled; that, in order to properly handle the growing business of the railroads at East Boston, tracks should come in at the east end of the water front and thus secure expansion in the easterly direction; that "A commission has been sitting, under the provisions of chapter 390 of the Acts of 1899, for the purpose of eliminating the railroad grade crossings at many intersecting streets, and it has under consideration plans for removing the railroad tracks which now occupy a strip of land through the centre of the island, and placing them on the east side, contiguous to the water front. While there are obstacles to this plan, they are not insurmountable, and the result would afford ready and accessible railroad accommodations to the water front of more than one-half the island.

"The Commonwealth is interested in the final determination of this question, as it now possesses a water front area in this vicinity the development of which depends in a measure upon the location of the tracks in solving the grade crossing problem, and the proceedings of the commission are closely watched by the Board and the Attorney-General."

In the report for 1902, — that a hearing relative to the claim of the East Boston Company began in November, 1902, before an auditor appointed by the Superior Court, and that the matter

was still pending; that "The growth and development of the shore front and interior of the district will be inevitably along the lines determined by the grade crossing commission, sitting under the provisions of chapter 462 of the Acts of 1900, which ought to be clothed with power not only to eliminate the grade crossings, but to so rearrange the location of all the railroad tracks as to permit of the most available use of the territory for the purposes for which it is best adapted, with a view to economical handling of goods, wares and merchandise, and dealing with all transportation problems."

In the report for 1903, — that "The claim of the East Boston Company has resolved itself into two questions: first, as to what portion of the flats taken is owned by the East Boston Company; second, what damage has the company suffered by the taking. The first question is being tried in the Court of Registration, and the evidence in support of the contention of the Commonwealth has been to a large extent supplied from the plans in this office and the testimony of the chief engineer of the Board. As the case is sharply contested on both sides, and there are many and various law points at issue, a final determination seems to be far distant. Meanwhile, the second of the above questions awaits the decision of the first; wherefore it is deemed inadvisable to recommend improvements of the flats whereby their physical condition might be materially changed, before the jury who must eventually pass on the question of damages shall have had an opportunity to take a view.

"In response to an inquiry from the Legislature in January last with reference to plans for a State dock at East Boston, or suggestions relating thereto, the Board replied in part as follows: —

"Replying to the fifth inquiry, the Board has considered it the part of wisdom to refrain from formulating plans for prospective improvement of the Commonwealth's land at East Boston until a decision in the East Boston case should finally determine the questions in litigation. . . . The size of the appropriation indicated to the Board the purpose of the Legislature to acquire the foreshore and flats before they became valuable, and to develop the same at some future time, when the demands of commerce seemed to require such development and an adequate appropriation should be made therefor.

"Plans have been considered in a very general way only. Several

considerations, in the opinion of the Board, would prevent the forming of plans for improvement of that locality at present. The chief objection at present is the unsettled condition of the grade crossing question in East Boston. Until that is fully and finally determined, it would be unwise, in the opinion of the Board, to develop these flats, and premature to form plans. The Commonwealth should be slow to again build piers and docks in any locality until access thereto is assured. The pier and dock of the Commonwealth at South Boston, which was built at an expense of about \$400,000, has lain unused for several years, simply for lack of a proper avenue of approach. The pier may remain unused until the piles are destroyed, unless Northern Avenue bridge shall be constructed.

“Therefore, under these circumstances, further consideration of plans for developing the front at East Boston have been held in abeyance.”

In the report for 1904, — that the question involving the title of the East Boston Company to certain of the flats at East Boston was still pending in the Land Court.

“The commission on the separation of grade crossings at East Boston has finally reported in favor of the plan advocated by the Boston & Albany Railroad Company, which permits its tracks to remain substantially in the location heretofore occupied through the center of the island; in consequence whereof the flats heretofore taken by the Commonwealth from the East Boston Company fail to receive the benefit which a relocation of the railroad tracks on the east side of the island would have given.”

In the report for 1905, — that the question involving the title of the East Boston Company, the largest owner, to certain flats at East Boston was still pending in the Land Court.

In the report for 1906, — that the question involving the title of the East Boston Company, the largest owner, to certain flats at East Boston, was still pending in the Land Court.

In the report for 1907, — that “Nothing, however, has as yet been done in the way of improvement of this territory for commercial purposes by building structures or by dredging, inasmuch as the question involving the title of the East Boston Company, the largest owner, to certain flats taken by the Commonwealth, is as yet unsettled.”

In the report for 1908, — that “The action of owners of flats on the easterly shore of East Boston to recover the value

of part of the land taken by the Commonwealth between Jeffries Point and Wood Island is still pending in the Supreme Judicial Court.

“The water front of East Boston will be the subject of a special report to the Legislature of the Board of Railroad Commissioners and the Board of Harbor and Land Commissioners, acting jointly.”

In the report for 1909, — that the suit of the East Boston Company, “long pending, was in September, 1909, decided by the Supreme Judicial Court in favor of the Commonwealth, so far as relates to the title of certain flats. The company contended that under an ancient grant prior to the Colony Ordinance of 1647 the line of ownership extended much farther from the mean high water line than the Commonwealth conceded. There remains to be determined by the court the value of certain flats which the Commonwealth always supposed to be the property of this company.”

In addition to the above-named reports reference is made to the report of the Joint Board of Railroad Commissioners and Harbor and Land Commissioners, made to the Legislature in January, 1909 (House, No. 291), under authority of chapter 134 of the Resolves of 1908 relative to the development of railroad and water-front facilities in East Boston which points out that “the only method of future comprehensive development of the water front on the east and west sides of East Boston for commerce and navigation is to lay railroad tracks from the Boston & Albany Railroad near Chelsea Creek to the east and to the west, and carry the same around the water front at the head of the piers on either side of the island.”

That part of the report of the Harbor and Land Commissioners for 1910 on the subject of East Boston flats is alluded to later herein.

In the preliminary report of the Joint Board under date of Jan. 1, 1910, previously cited on page 18, the following statement and recommendations in respect to the East Boston flats were made: —

In view of the general situation, the location and ownership of the flats, the probable demand in the future for increased accommodations for commerce and manufactures, and the still existing opportunity of

preserving this fine location for large development, this Board recommends (1) that the city of Boston be requested to convey to the Commonwealth Apple Island and surrounding flats and the flats in front of Wood Island Park, and (2) that the Commonwealth authorize its Board of Harbor and Land Commissioners to acquire such additional land and rights as may be necessary to provide for railroad tracks from the 100-acre lot to the Grand Junction Railroad and the Boston & Maine Railroad, and for a car storage yard and a traffic road; and that provision be made for a crossing not at grade with the Boston, Revere Beach and Lynn Railroad.

The Legislature, in furtherance of this suggestion, passed an act, — chapter 648 of the Acts of 1910, — approved June 15, 1910, being “An act to provide further for the development of the Commonwealth’s flats at East Boston,” authorizing the Harbor and Land Commissioners to acquire certain land and flats on the easterly side of East Boston, for the purpose of securing access to the land and flats of the Commonwealth; to exchange land or flats; to fill flats and build one or more wharves on the land, flats or rights therein now owned or hereafter acquired by the Commonwealth; and to do such dredging as may be necessary to secure suitable access to such piers or wharves, “whenever satisfactory contracts are made with the Commonwealth for the use of such railroad right of way, filled flats or pier or wharf at a rental, for a term and upon provisions, restrictions and obligations which are deemed reasonable and in the public interest by said Board, and approved by the Governor and Council, or when a satisfactory and reasonable contract as aforesaid is made for the use of such rights of way, lands or flats without such grading, surfacing, filling or building.” This act further provided that before exercising the powers conferred thereby this Board should obtain from the city of Boston a conveyance of all its present right, title and interest in Apple Island and the flats appurtenant thereto, or any other flats and rights of said city on the easterly side of East Boston which in the opinion of this Board are required for the development hereunder, without expense to the Commonwealth therefor. This act provided further for the issue of bonds to the amount of \$3,000,000 to meet the expenses incurred under the act.

Another act, chapter 623 of the Acts of 1910, authorized the change and advancement of the harbor line at and near Jeffries Point.

In October, 1910, a communication was sent to the mayor of Boston on the subject of the acquisition by the State of the flats and rights at East Boston owned by the city, as provided for in this act, but no conclusive action thereon was taken by the municipal authorities.

The restrictive provision of this act as to the expenditure of the appropriation of \$3,000,000, as well as other provisions thereof, were widely discussed and criticised by commercial bodies and others, and were considered by the Joint Board previously alluded to, before the filing of its final report of Dec. 31, 1910. Its conclusions and specific recommendations were as follows:—

The most favorable place for a large development of a water and railroad freight terminal in Boston harbor is the easterly side of East Boston. The Commonwealth has acquired, under the provisions of chapter 486 of the Acts of 1897, an area having a frontage of over 3,000 feet, as shown on plan herewith. It also owns large areas of flats to the north and east of this taking. The areas owned by the State, by the city of Boston and by the United States aggregate in round numbers about 2,000 acres. They are now useless to any person, but could be developed at reasonable expense into a railroad and steamship terminal, with long piers, large warehouses and ample railroad freight yards.

The plan outlined in 1897 by the State Board on Docks and Terminal facilities was to build short piers 600 feet long, and connect the same with the Boston & Albany Railroad. Piers of that length would be adapted to coastwise steamers and barges, and supply the reasonable needs of manufacturing plants which may be located on the easterly side of East Boston. A new and larger plan of development has been outlined and considered by the Joint Board.

The harbor line has been changed, as shown on the plan, to accommodate the larger development suitable for the dockage of the largest steamships afloat. If piers are built on the harbor line of 1910, the result will be the closing of a good channel at Jeffries Point, and the necessity of dredging Bird Island flats, part of which have already been dredged for the increase of the anchorage area in Boston harbor. It would also be necessary to increase the depth of the back channel or Governors Island Channel from President Roads to the piers which might be constructed on the harbor line of 1910. The dredging of

Bird Island flats and the deepening of this channel would be a very expensive undertaking.

If this project is undertaken, the piers must be connected by highway and railroad with the central part of East Boston.

Chapter 648 of the Acts of 1910 authorizes the construction of highways and the location and filling for railroad connections, also the building of piers whenever any person or corporation desires to lease and use the same.

The Joint Board recommends the development of the East Boston flats, as authorized by chapter 648 of the Acts of 1910, as soon as there is evidence of a demand for additional piers and docks.

In the report of the Harbor and Land Commissioners for 1910 reference is made to a plan therewith for a water front and railroad terminal at East Boston. This plan was based on surveys made from time to time under the direction of the Board, and, as its title explained, showed a possible development for that locality.

It was set forth in this report that this plan did not contemplate the building of the proposed pierheads on the State harbor line of 1910. "The object in locating the pierheads near Jeffries Point as shown is to preserve the present channel opposite the Simpson's dry docks and the present piers at the point, thereby permitting the private owners to continue to use the present piers, and obviate for a time the necessity for dredging Bird Island flats, as required by the War Department in its approval of Sept. 27, 1910, provided the piers should be extended to the harbor line of 1910.

"Beginning with the pier numbered 4 on the plan appended hereto, the new piers would be built upon flats owned by the Commonwealth, and could hereafter be extended to the new harbor line of 1910. The Governors Island Channel from President Roads would be dredged to connect with the main ship channel, and would be fully adequate to accommodate ships using the proposed piers. At a later date, if additional facilities for navigation should be required, the remaining area of Bird Island flats could be dredged, the anchorage basin enlarged and the Jeffries Point piers then extended to the harbor line of 1910 by license of the Commonwealth, on payment of a reasonable proportion of the cost of the dredging.

"If the Boston, Revere Beach & Lynn Railroad is taken over by the New Haven road, as petitioned for, its tracks at grade would be eliminated, and a feasible and inexpensive connection could then be made between the present Grand Junction terminal at East Boston and the new piers shown on the plan. Convenient connection by rail could also be made over the flats of the East Boston Company between the proposed piers and both the Grand Junction Railroad and the Boston & Maine Railroad location at East Boston, as shown on the plan. . . .

"The 2,000 acres shown should be devoted to a steamship and railroad terminal, and held by the Commonwealth for the demands of the future.

"The reclamation of the flats in this location is not a land speculation. It is for a great terminal. No plausible appeals should induce the Commonwealth ever to part with its title, or to so far part with its control that any railroad could be kept out of the track yard, or any steamship be forbidden to berth at these piers. Low and uniform switching and dockage charges should be maintained, and no profits expected or permitted. When the demand arises, expense should not be spared. . . .

"The Commonwealth should develop a great terminal, at which the railroad and steamship lines may come and make their exchanges."

A specific recommendation in this report was that this Board be authorized "to construct a bulkhead and fill a suitable portion or portions of these flats, and that an appropriation be made therefor."

In passing chapter 648 of the Acts of 1910 the Legislature reaffirmed the policy of public ownership and control of a portion of the water front in Boston harbor, adopted thirteen years previously by the passage of chapter 486 of the Acts of 1897, and provided for the improvement and further development of the East Boston flats under the continued agency and administration of the Board of Harbor and Land Commissioners, a Board upon which the Legislature had hitherto conferred full and complete authority to act in matters concerning Boston and other harbors and tide waters throughout the Commonwealth.

This Board, moreover, had made, even as far back as 1882,

many surveys of the East Boston section, and had made borings and studies which would have enabled it to plan and build these piers and docks, and provide the necessary sites for industrial and warehouse purposes, and rail connections, more expeditiously than any other agency or board of control, in case there were any parties desirous of entering into a lease of the same.

Present Piers and Docks.

In previous years, particularly in 1907, statements as to piers and docks in Boston harbor available for large trans-Atlantic steamships, and the uses made of these terminals, have been made in the annual reports of the Board. The ownership or control of the terminals in this port, used by practically all of the foreign steamship lines, is in the New York, New Haven & Hartford Railroad Company and the New York Central & Hudson River Railroad Company.

No charge for dockage rights is made by the railroads against the steamship companies, and no wharfage charge made by the railroad companies on goods going or coming over their own rails.

These terminals are as follows: in South Boston, on the harbor frontage adjoining the Commonwealth Pier, owned and controlled by the New York, New Haven & Hartford Railroad Company. Three piers have been built, one by the State and two by railroad companies. There are four docks, varying in length from 770 feet to 1,050 feet, with depths of from 26 to 35 feet at mean low water. The width of the docks varies from 100 feet to 120 feet. The average width of Pier 2 is about 250 feet, and of Pier 4 about 170 feet. There is also a site for another long pier between the present piers 2 and 4. In the dock on the westerly side of Pier 4 is a freight car ferry landing. A grain elevator which was built some years ago near Pier 2, with a capacity of 500,000 bushels, is now being removed. Little or no use of these facilities is made at present by any foreign steamers.

In Charlestown, at the mouth of the Charles River, known as the Hoosac Tunnel Docks, owned by the Boston & Maine Railroad and now controlled by the New York, New Haven &

Hartford Railroad Company. Three piers have been built. There are four docks, varying in length from 310 feet to 630 feet, with depths of from 30 feet to 35 feet at mean low water. The width of the docks varies from 30 feet to 160 feet. The width of the piers varies from 150 feet to 350 feet. A grain elevator of 1,000,000 bushels' capacity has been built. The White Star, Warren and other lines use this terminal, and operate some of the largest passenger steamers which come to this port. The restricted and utterly inadequate facilities at this terminal, by reason of the length of piers and docks and the width of the river, which is only about 625 feet at this point, are matters of common knowledge, and the removal of a part of the business done here to another location, possibly the Commonwealth Pier, seems absolutely necessary in the near future.

In Charlestown, at the mouth of Mystic River, known as Mystic Wharf, owned by the Boston & Maine Railroad and now controlled by the New York, New Haven & Hartford Railroad Company. There is below the bridges a berth or quayage of about 900 feet on the south channel, the depth in the berth varying from 27 feet to 30 feet at mean low water; a berth or quayage of about 1,200 feet on the harbor frontage, the depth in this berth being about 35 feet at mean low water; a dock about 600 feet long and about 180 feet wide, with a depth of about 28 feet at mean low water. In this dock is a freight car ferry landing. A grain elevator of 500,000 bushels' capacity has been built. This terminal is used by the Allan, Furness and other lines.

In East Boston, on the harbor frontage, known as the Grand Junction wharves, owned by the Boston & Albany Railroad Company and now controlled by the New York Central & Hudson River Railroad Company. Three piers have been built to the pierhead line, varying in length from 650 feet to 780 feet; one other pier, 780 feet long and 205 feet wide, has been authorized to be built to that line, under license from this Board granted in 1910, but is not yet completed; still another pier has been built adjoining the East Boston terminal of the Boston, Revere Beach & Lynn Railroad, its length being about 380 feet, which can be extended about 400 feet to the pierhead line, —

making in all five piers within an area about 1,800 feet in length on the water front and about 1,100 feet in depth between Marginal Street and the pierhead line. The width of the piers varies from 51 feet to 240 feet. There are four docks varying in length from about 600 to 780 feet, with depths of 35 feet at mean low water. The width of the docks varies from 155 to 250 feet. The piers at this terminal have been reconstructed, and a grain elevator of 1,000,000 bushels' storage capacity and a system of conveyors for delivering grain to the steamer berths built, since a destructive fire in 1908. This terminal is used by the Cunard, Leyland and other lines, but actual use of the first-class facilities now provided here at a cost of about \$4,000,000 does not exceed 50 per cent. of its capacity.

The Terminal Wharf and Railroad Warehouse Company, a Massachusetts corporation, has completed and put in use during the past year an important piece of work. It is a long wharf on the Mystic River shore next westerly of the freight terminal of the Boston & Maine Railroad, about northerly from Elm Street in Charlestown. It consists of a pier about 694 feet long and 135 feet wide, with berths on one side and at the end about 830 feet in length and having a depth of 28 feet at mean low water.

Two large fireproof warehouses, built of steel and reinforced concrete and cement floors, are now occupied for storage of sugar, wool and various commodities. The warehouses are about 550 feet long and 70 and 85 feet wide, respectively, and nine stories high.

Five railroad freight tracks extend from the Boston & Maine Railroad, Mystic branch, alongside the warehouses and on the pier. A cargo may be discharged from the hold of vessels into cars or into warehouses. The merchandise may be taken by electric hoists in and out of the warehouses and deposited on trucks or in cars.

It is the only large new pier equipped and supplied with hoists and warehouses which has been constructed by private capital at this port in many years. It is gratifying to note that it is in successful operation.

American Buildings Trust.

The most important matters concerning Boston harbor which this Board, under the authority contained in chapter 748, Acts of 1911, section 19, has considered up to the date of expiration of its authority to act, namely, Oct. 28, 1911, are the various petitions of the American Buildings Trust. In May, 1911, its representatives conferred, informally, with the Board in reference to a project which they had formulated, involving the acquisition and development of a large territory on the south side of the Reserved Channel at South Boston, lying between property owned by the Boston Elevated Railway Company and the Marine Park at City Point, to be used in connection with those developed and undeveloped sections of the Commonwealth's flats at South Boston which lie north of the Reserved Channel and Summer Street, as well as south of Summer Street, and easterly of the pier under construction for the fish industry, extending as far as the junction of the north line of the Reserved Channel with the main ship channel of the harbor. It was represented that title to property in South Boston between East First Street and the south side of the Reserved Channel had been acquired or contracted for by the trust; petitions would later be filed with the Board for the acquisition, by purchase or lease, of that portion of the State's holdings above mentioned, and that the ultimate object to be accomplished was the development of all the land and flats acquired by the erection of warehouses, factories and other buildings, by the construction of large piers and docks, by the dredging of approach channels, and by other work, thus creating a great industrial terminal, with rail and water connections, similar to the Bush Terminal at Brooklyn, N. Y. All of this work it was proposed should be carried out by a corporation to be later organized under Massachusetts laws, and paid for by private capital, without aid from the Commonwealth. It was estimated that the expenditure for this development would be from \$10,000,000 to \$20,000,000. One important part of this project, it was represented, required a change in the lines of the Reserved Channel, established under authority of chapter 46 of the Re-

solves of 1886, to be made by straightening the same below L Street bridge, thus, after dredging, permitting a more direct approach from the main ship channel to all the property on the south side of the Reserved Channel, and enabling the trust to create a quayage on this new channel location as their plans contemplated.

Subsequently, the Legislature, by chapter 90 of the Resolves of 1911, approved June 6, authorized the Board to change the location of any or all that portion of this channel east of L Street bridge, subject to the approval of the Governor and Council.

On June 9 a petition was filed for license to fill solid and build structures in Boston harbor near the Marine Park at South Boston.

On June 14 a petition asking the Board to change the location of the Reserved Channel, as authorized by this resolve, was filed, together with plans of suggested change.

On July 6, after public notice, a hearing was given on the petition relating to the change in channel location, at which representatives of the city of Boston and of various corporations, also individuals owning property on this channel, both above and below L Street bridge, appeared and were heard. No opposition was offered to the proposed change of location. Hearing on the petition relating to filling solid was postponed to July 20, 1911.

On July 17, 1911, three petitions of the American Buildings Trust, in relation to the purchase and lease of the certain lands and flats aforesaid of the Commonwealth, being a part of the tract known as the Commonwealth's flats at South Boston, were presented and a hearing thereon assigned for Sept. 21, 1911.

On July 20 further hearing was given on the petitions filed on June 9 and 14.

On September 21, after publication of notice, a hearing was given on the three petitions filed on July 17. At this hearing counsel for the petitioner made brief statement of the proposed project of development, and announced that a company, to be known as the Port of Boston Docks and Warehouse Company, had been incorporated under the laws of Massachusetts to

carry the same into effect. Members of the Boston Chamber of Commerce committee on metropolitan improvements, and others, were present at this hearing and opposed any decision by the Board, and requested that, inasmuch as this was a matter over which the Directors of the Port of Boston, to be appointed under chapter 748 of the Acts of 1911, passed July 28, would have jurisdiction, it be left open for their consideration when appointed. Objection, on the same ground, was also made by parties present to any action by the Board on the two pending petitions in relation to changing and straightening the Reserved Channel, and to the filling and building of structures in tide water near the Marine Park.

Owing to the strong opposition, as stated, to the three petitions relating to the acquisition of land and flats belonging to the Commonwealth, and to the short time for consideration and action by this Board before the termination of its powers, counsel was permitted to withdraw the same without prejudice; but action was urged on the remaining channel petitions.

Subsequently, on October 25, the Board issued a license to the American Buildings Trust to build a sea wall, fill solid and dredge in tide water of the harbor between P Street and Farra-gut Road out to the south line of the Reserved Channel as established by the provisions of chapter 46 of the Resolves of 1886.

The Board caused various plans to be made of the lines of a new Reserved Channel from L Street bridge to the main ship channel, made borings and gave careful consideration to changing and deepening the Reserved Channel, and were strongly inclined to the view that a change could be made in the lines which would be a decided public improvement to the navigation interests.

It did not decide the question, partly because urged to leave it open for consideration by the Port Directors, and partly from the limited time in which to carefully prepare the papers and obtain the approval of the Governor and Council.

Action by the Board in relation to all matters pertaining to Boston harbor has been confined, subsequent to October 28, solely to the supervision and direction of work contracted for

previous to the passage of said chapter 748, and to the necessary approval of payments to contractors for work done under such contracts.

The Board submits the following summarized statement:—

1. The Commonwealth, since 1873, has been engaged in the work of reclaiming and developing the territory known as the Commonwealth's flats at South Boston, and has filled flats, built piers and docks for commercial purposes and done other work in that section of the city frontage representing an actual expenditure to Dec. 1, 1911, of approximately \$4,227,300.

All of these piers, now owned by the State, with the exception of the Commonwealth Pier and that under construction for the fish industry together with adjacent parcels of land, are now used under leases from the State which yielded in 1911 a total revenue of \$75,121.68.

2. Eleven large piers can be built on the Commonwealth's lands and flats at South Boston on the harbor frontage, and many smaller piers on the Reserved Channel, and connected with the tracks of the New York, New Haven & Hartford Railroad.

3. The Commonwealth Pier can be made available for use by the construction of sheds thereon, and made easily accessible from Summer Street by means of an elevated way over the intervening land.

4. The Commonwealth has held, since 1898, a tract of land and flats at East Boston, taken under authority of legislation passed in 1897, amounting to about 100 acres, and now owns undeveloped tide lands in this locality of many acres in extent. It is now in litigation with the East Boston Company as to the value of about 40 acres of flats within this 100-acre tract. Upon this area 21 large piers can be built, and made available by dredging approach channels and docks, as shown on plan with the report for 1910.

5. A Massachusetts corporation, it is represented, is desirous of acquiring all the remaining improved and unimproved territory now belonging to the State at South Boston, and of expending \$10,000,000 to \$20,000,000 of private capital, without aid from the State, in building large piers and docks, dredging

approach channels and doing other work, thus creating a great industrial terminal at this port, with rail and water connections.

6. The piers and docks in Boston harbor, used by practically all regular foreign steamship lines which come to this port, are either owned or controlled by two railroad corporations, namely, the New York, New Haven & Hartford Railroad Company and the New York Central & Hudson River Railroad Company. The railroad companies charge no rental to the steamship companies for the use of these piers and docks.

7. The terminal on Charles River, known as the Hoosac Tunnel Docks, is inadequate for the needs of passenger steamships which now use it, and a transfer of a part of the business now transacted there to another location in the harbor, possibly to the Commonwealth Pier, will be necessary in the near future.

8. The piers and docks, known as the Grand Junction wharves, at East Boston, are up to date and equipped with modern facilities for handling passengers and cargo. The use of this terminal does not exceed 50 per cent. of its capacity.

The Board is still of the same opinion as expressed in the report for 1910 relative to the most important and advantageous developments of the port of Boston; the Commonwealth Pier should be covered with proper sheds well equipped to receive and discharge both passengers and cargo, and an overhead viaduct at a proper level built to connect the second story of the sheds with Summer Street, so that passengers may be received on the upper level and freight in cars be delivered on the lower level; and, secondly, the bulkheading of the large area of Commonwealth's flats at East Boston should be commenced and the filling behind the bulkhead be prosecuted with reasonable speed, in preparation for the construction of long piers and deep berths for the ocean-going steamships of the future, and connecting such piers with railroad tracks, yards and warehouses.

These flats should be developed on elastic lines for the great steamship-railroad terminal of the near or distant future.

The recommendation of the Board on Docks and Terminal Facilities, in its report of 1897, should be followed, and this area and the South Boston water front be preserved in public ownership.

THE IMPROVEMENT AND PROTECTION OF RIVERS, HARBORS,
TIDE WATERS AND FORESHORES.

By chapter 481 of the Acts of the year 1909 the Board is authorized and directed to undertake such work for the improvement, development, maintenance and protection of rivers, harbors, tide waters and foreshores within the Commonwealth as it may deem to be reasonable and proper, and may expend during the years 1910, 1911 and 1912 a sum not exceeding \$300,000, not more than \$100,000 to be expended in any one year.

This act also provided that the Board shall consider the general public advantage of the proposed work, the local interest therein as manifested by municipal or other contributions therefor, the importance of the industrial or commercial and other interests to be especially served thereby, and any other material considerations affecting the feasibility, necessity or advantage of the proposed work or the expenditure therefor. It was further provided that no work shall be commenced until after a public hearing has been held and a survey and estimate of cost has been made; that a city or town might appropriate money for the improvement of rivers, harbors, tide waters and foreshores within its jurisdiction, the money so appropriated to be paid into the State treasury, to be expended by the Board for said purposes; and that the city or town might assume liability for all damages to property suffered by any person by any taking of land, or of any right, interest or easement in land within the city or town made by the Board for the purposes authorized by the act. In order that the Board may make further improvements and do such other work as is described in chapter 481 of the Acts of 1909 it is recommended that legislation be passed authorizing further expenditures by the Board in the years 1913, 1914 and 1915 for the purposes set forth in said chapter 481.

Petitions have been presented during the year for improvements in the following localities: Bucks Creek, in Chatham; Cohasset harbor; Concord River; Cuttyhunk harbor; Deacon's Pond harbor, in Falmouth; Hull; Harbor Cove, in Gloucester; Manchester harbor; Mill River, in Gloucester; North River,

in Marshfield, Norwell, Hanover and Pembroke; Pamet River, in Truro; Point Shirley, in Winthrop; Winthrop harbor; Witchmere harbor, in Harwich. The petitioners for improvement of Allens harbor, in Harwich; Concord River, in Billerica; Connecticut River, near Mt. Tom junction; Dorchester Bay, between Savin Hill and Commercial Point; Gloucester canal, in Gloucester; Green Hill, ocean side, in Hull; Mitchell's River in Chatham; Paskamansett River, in Dartmouth; Swampscott Bay; Watch Hill, in Chatham; Wild harbor, in Falmouth, were severally granted leave to withdraw.

Action has been taken on pending petitions, as follows: —

BUCKS CREEK, CHATHAM.

Petitions of Alonzo F. Cahoon, and others, for improvement of Bucks Creek in the town of Chatham, presented Feb. 23, 1910, and Feb. 15, 1911.

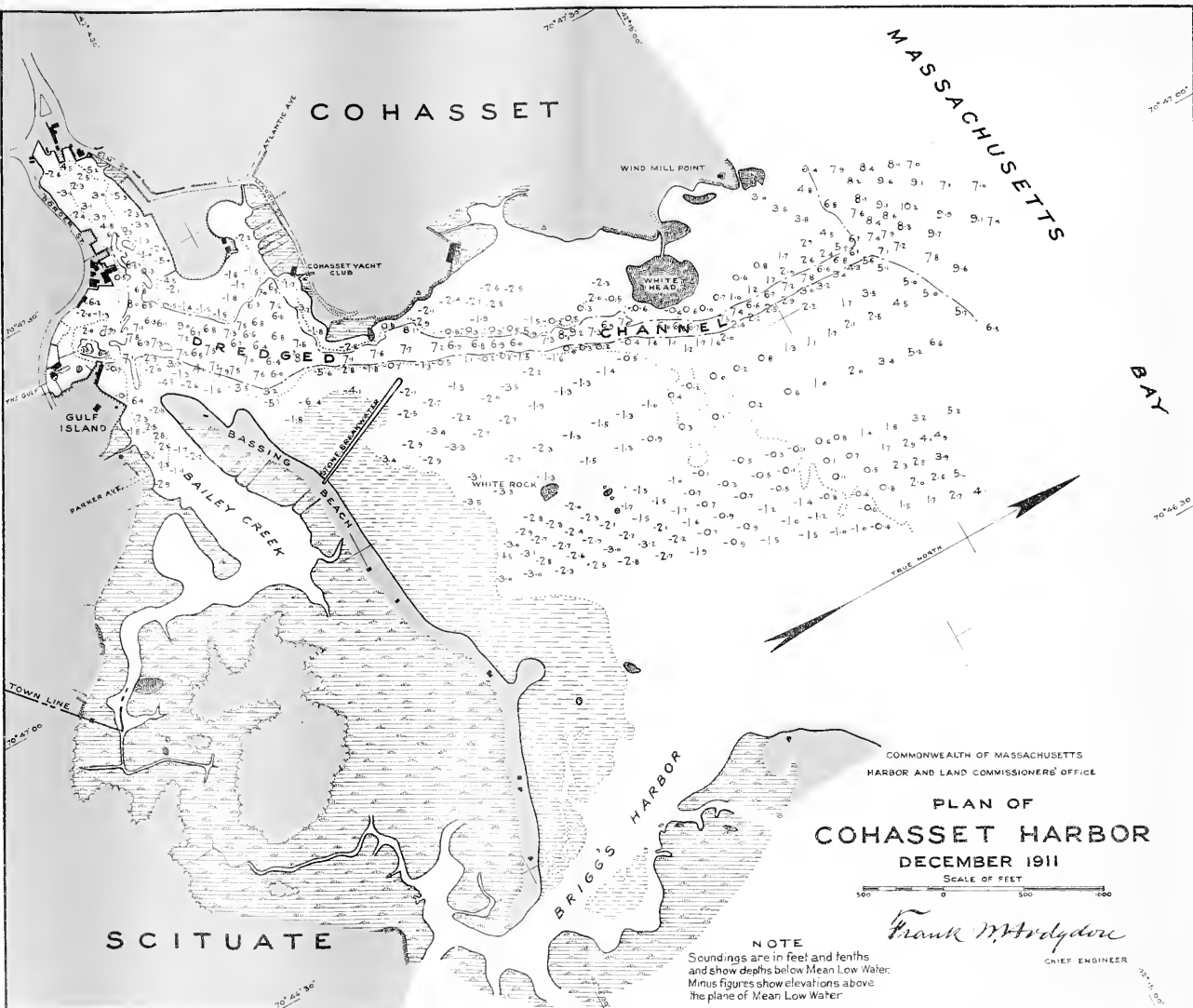
This creek is the outlet of Taylors Pond, in the southwesterly part of Chatham, and its outlet is used as a harbor by a fleet of fishing boats. The first improvement by the Commonwealth was made in 1904 and 1905 by the construction of a pile and timber jetty on the westerly side of the mouth of the creek.

On May 20, 1910, a contract was entered into with James H. Connolly, to build two stone jetties, to excavate the channel between the jetties to the level of mean low water, and to construct a dike across the present channel near the inner end of the easterly jetty, the channel between the jetties to be about 200 feet long, excavated 70 feet wide on the bottom, at the plane of mean low water; the banks to be protected by stone riprap; the dike to be about 400 feet long and 20 feet wide at the top. The contract prices were \$2,600 for excavating the channel and building the earth portion of the dike, and \$2.35 per ton for furnishing and placing stone in the jetties and riprap.

All of the work was completed Jan. 7, 1911, at a total cost of \$10,543.51 of which \$1,000 was contributed by the town of Chatham and the fishermen using this creek. A hearing has been held on the petition presented Feb. 15, 1911, but no further action has been taken.

The amount expended during the year is \$7,645.84.

The total amount expended to Dec. 1, 1911, is \$11,633.86.



COHASSET HARBOR.

Petition of Louis I. Goodwin, and others, a committee appointed by the Harbor Improvement Committee of Cohasset, for a breakwater on or near Bassing Beach in Cohasset, presented Jan. 28, 1910; and petition of Clarence W. Barron, and others, for further improvement of this harbor, presented Feb. 3, 1911.

In the spring of 1910 a survey was made of this harbor and a project for improvement prepared. The town having appropriated \$5,000 and private parties an additional \$7,000 in aid of this project, a contract was entered into on July 18, 1910, with Thomas Fitzgibbon, for the construction of a stone breakwater at the entrance to the inner harbor, extending from a point on Bassing Beach about 1,200 feet northeasterly from its southwesterly end and to extend therefrom about 800 feet northwesterly. The contract price was \$2.13 per ton for furnishing the stone and building the breakwater. The work was completed Oct. 10, 1911, at a cost of \$10,404.83.

On July 18, 1910, a contract was made with Jeremiah P. O'Riorden for dredging an anchorage basin and channel leading therefrom to the town landing, in the inner portion of the harbor, the basin to be made by dredging to the depth of 6 feet at mean low water an area of flats about 1,100 feet long and 300 feet wide, lying northwesterly of the present channel and extending from a bend therein about opposite the Cohasset Yacht Club house to the present anchorage basin. The channel leading to the town landing was to be dredged 4 feet deep at mean low water, 100 feet wide on the bottom, and to be about 700 feet long. The contract price was 14 $\frac{5}{8}$ cents per cubic yard measured in scows.

The total amount expended during 1910 was \$21,191.76.

Owing to the fact that the contract price was less than the estimated cost of dredging, two additional areas adjoining that named in the contract were dredged, but the Board was unable to excavate the inner end of the channel to the full depth on account of ledges and boulders which were encountered. All of the dredging was completed Dec. 2, 1910, at a cost of \$20,785.05.

In addition to the work described above the citizens of the

town, at their own expense, caused the entrance channel to be dredged 60 feet wide on the bottom and 6 feet deep at mean low water.

There being a small balance remaining from the allotment made by the Board from the appropriation, and the town and citizens having agreed to increase their contributions, a contract was entered into on May 5, 1911, with the Bay State Dredging Company, Ltd., to widen the entrance channel and to remove certain shoals which had formed during the previous year, also to enlarge the anchorage basin by dredging an area near the Government wharves. The contract price was 21.9 cents per cubic yard measured in scows. While this work was in progress further sums were contributed by the citizens of Cohasset and the channel in the upper harbor was extended to the wharves at the mouth of James River.

The depth of this excavation varies from 2 to 6 feet at mean low water, the bottom being either rocky or so hard that a greater depth could not be secured. In addition the lower portion of Bailey's Creek up to the point opposite Parker Avenue was dredged to a depth of from 2 to 6 feet at mean low water, the bottom here also being largely rock or hardpan.

A plan of Cohasset harbor accompanies this report.

The amount expended during the year is \$27,376.72.

The total amount expended to Dec. 1, 1911, is \$48,568.48.

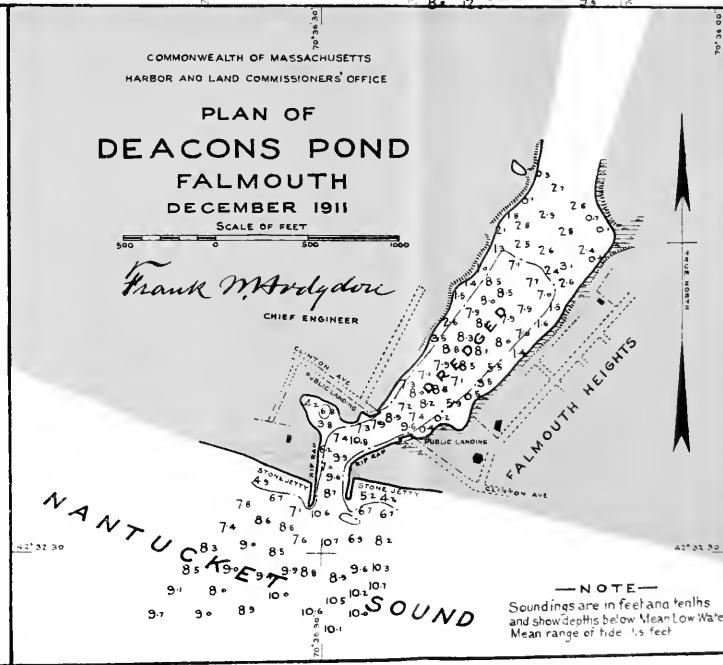
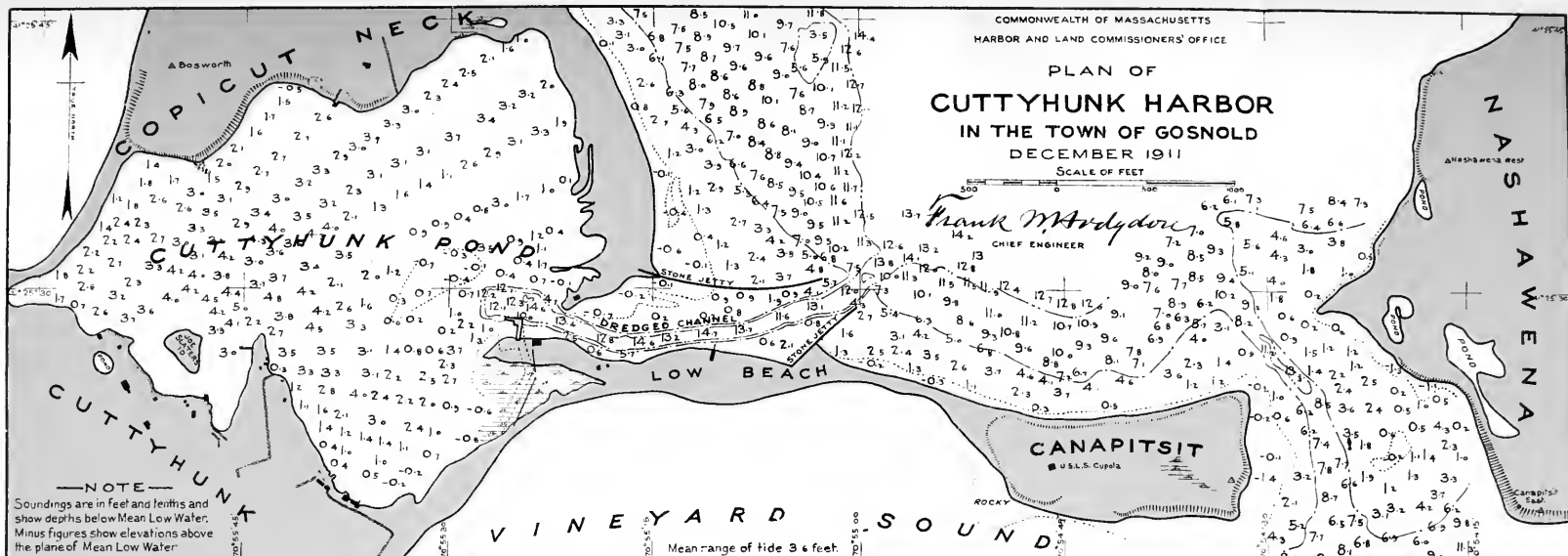
CUTTYHUNK HARBOR.

Petition of the selectmen of the town of Gosnold, and others, for extending and strengthening the jetties built by the Commonwealth, presented Feb. 13, 1911.

A hearing was given on this petition and an estimate of cost of the work was subsequently made. No further action thereon has been taken.

Under appropriations made in 1905 and 1907, two stone jetties were built at the harbor entrance.

On Dec. 10, 1909, a contract was entered into with John R. Burke, to dredge a channel 60 feet wide on the bottom, 12 feet deep at mean low water and about 2,200 feet long, extending from the outer harbor to deep water just inside the



Narrows at the entrance to Cuttyhunk Pond, and to dredge to the same depth an anchorage basin 300 feet long and 150 feet wide just inside the Narrows. The contract price was \$15,600.

The dredging of the channel and anchorage basin was completed Dec. 9, 1910. In addition 13,408 cubic yards were excavated to widen the channel at the entrance and to round off a sharp angle near the inner end of the channel. Upon the completion of this work there was a navigable depth in the channel of 12 feet at mean low water from the sea to the wharf built by the town of Gosnold. A plan of Cuttyhunk harbor accompanies this report.

Appropriations:—

Chapter 33, Resolves of 1900,	\$1,000
Chapter 450, Acts of 1905,	5,000
Chapter 542, Acts of 1907,	7,500
Chapter 142, Resolves of 1908,	7,500
Chapter 132, Resolves of 1909,	10,000
By the town of Gosnold,	5,000
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Total,	\$36,000

The amount expended during the year is \$5,778.68.

The total amount expended to Dec. 1, 1911, is \$36,330.02.

DEACON'S POND HARBOR.

Petitions of the selectmen of the town of Falmouth, and others, for further improvement of Deacon's Pond harbor in the town of Falmouth, presented to the Board Jan. 19 and Dec. 19, 1910.

The dredging of a channel from Vineyard Sound into Deacon's Pond and of a basin in said pond for anchorage purposes, also the work of building two stone jetties at the entrance channel, under authority of chapter 461 of the Acts of 1906 and chapter 495 of the Acts of 1907, was completed in 1909. The entrance channel was dredged to a width of 150 feet on the bottom and 7 feet deep at mean low water, and an anchorage basin dredged to the same depth over an area of

about 4 acres located above and below a portion of the highway, formerly Clinton Avenue but now discontinued and the roadway removed.

The total amount expended to Dec. 1, 1909, was \$35,007, of which \$10,000 was contributed by the town of Falmouth.

A survey was made of this harbor early in 1911, showing that a shoal had formed along the easterly side of the entrance just inside the jetties. An estimate of cost was made, and it was concluded to remove this shoal, also to extend the anchorage basin at its northerly end.

The town of Falmouth having appropriated \$2,000 as a contribution towards the cost of the desired improvement, a contract was entered into on April 5, 1911, with John R. Burke to remove this shoal, which was about 400 feet long and 50 feet wide, and to extend the anchorage basin over an area about 350 feet long and 350 feet wide northeasterly of and adjoining the area dredged in 1909, all dredging to be done to a depth of 7 feet at mean low water. The contract price was 25.9 cents per cubic yard measured in scows.

All of the work was completed June 6, 1911, at a total cost of \$10,140.61.

A plan of Deacon's Pond harbor accompanies this report.

The amount expended during the year is \$10,140.61.

The total amount expended to Dec. 1, 1911, is \$45,147.61.

HARBOR COVE, GLOUCESTER.

Petition of Cunningham & Thompson Company, and others, for improvement of Harbor Cove in the city of Gloucester, presented March 17, 1911.

In August and September, 1911, a survey was made of this cove, and an estimate of cost of improving the same, in accordance with this petition, was subsequently prepared. This matter is still under consideration.

The amount expended during the year is \$179.57.

MANCHESTER HARBOR.

Petitions of the selectmen of the town of Manchester for the dredging of Manchester harbor, presented Sept. 7, 1910, and Oct. 25, 1911.

The dredging of the channel in this harbor between Point of Rocks and the railroad bridge, within the lines of the survey made by the United States engineers, a distance of about 1,800 feet, to a width of 75 feet on the bottom and to 6 feet in depth at mean low water, under authority of chapter 126 of the Resolves of 1907, was completed in January, 1908.

In addition to the appropriation of \$8,000 made by this resolve, the town of Manchester appropriated \$2,500 which was expended in dredging the channel above the railroad bridge.

The total amount expended to Dec. 1, 1908, was \$8,128.58.

In May and June, 1911, a survey was made, and after an estimate had been prepared of the cost of further improvement as petitioned for, and an appropriation of \$6,000 made by the town as a contribution toward the cost of the work, a contract was entered into on July 26, 1911, with Jeremiah P. O'Riorden for widening the inner portion of the channel from the railroad bridge down stream nearly to Bow Bell Ledge, the upper portion of the channel from the railroad bridge nearly to Reed's wharf to be 200 feet wide on the bottom and the balance not less than 100 feet wide on the bottom, all to a depth of 6 feet at mean low water. The contract price was $26\frac{2}{10}$ cents per cubic yard, measured in scows.

All of the work was completed Sept. 26, 1911, at a total cost, including supervision and incidental expenses, of \$15,-963.18.

No action has been taken on the petition presented Oct. 25, 1911.

The amount expended during the year is \$15,970.28.

The total amount expended to Dec. 1, 1911, is \$24,098.86.

MILL RIVER, GLOUCESTER.

Petitions of Wm. A. Hodgkins, and others, for the improvement of Mill River, in the city of Gloucester, presented March 18, 1910, and Jan. 6, 1911.

This river is a branch of the Annisquam River, and the tidal portion extends from the end of Wheeler's Point to the mills at Riverdale, a distance of about one mile.

A survey covering the whole of this stream was made in August, 1911, and an estimate of the cost of dredging a chan-

nel 50 feet wide on the bottom and 6 feet deep at mean low water has been made.

This matter is still under consideration.

See plan of Annisquam River.

The amount expended during the year is included in the amount expended at Annisquam River and Lobster Cove.

NORTH RIVER.

Petitions of the selectmen of Norwell, Pembroke, Hanover and Marshfield, and others, for the removal of rocks and obstructions in North River, presented Dec. 7, 1910.

In 1908, under authority of chapter 106 of the Resolves of that year, the Board made a report in relation to this river and the removal of boulders therefrom, together with an estimate of cost of clearing the channel, but no work was undertaken.

In March, 1911, plans and specifications were prepared, and the towns of Norwell and Marshfield having each appropriated \$500, followed by an appropriation of \$300 by the town of Pembroke, a contract was entered into on April 14, 1911, with Thomas Fitzgibbon to remove boulders from this river between a point just below Union bridge between Norwell and Marshfield and the stone bridge near the village of Hanover, and thus provide a safe navigable channel up to the mouth of Third Herring Brook, the boundary between Hanover and Norwell. The contract price was \$2.83 per ton for removing boulders and disposing of the same. The town of Hanover having contributed \$500 towards the cost of extending the work above Third Herring Brook, work under this contract was later extended to provide a clear channel up to the landing in that town.

All work was completed Oct. 13, 1911, at which time the channel had been cleared of boulders for a width of not less than about 100 feet the whole distance from the landing at Hanover to the sea. The portion of the river thus improved is used by a large number of motor boats throughout the summer.

The total cost of the work, including supervision and incidental expenses, was \$4,879.61. The total amount expended upon the improvement of this river to Dec. 1, 1911, is \$3,819.88.

WINTHROP HARBOR AND POINT SHIRLEY.

Petition of the selectmen of the town of Winthrop, and others, for widening and deepening the channel in Winthrop harbor, presented Dec. 19, 1910; and petition of the Point Shirley Yacht Club, and others, for dredging the approach to the wharves and float of said club, presented March 8, 1911.

In April, 1911, surveys were made of the localities referred to in these petitions, showing that shoaling had taken place in the channel leading to the old steamboat landing which seriously interfered with its use; also that at Point Shirley a small amount of dredging would open up the approach to the Yacht Club landing which is used by most of the residents in that locality.

Estimates of cost were prepared, and a contribution of \$700 having been made by the town of Winthrop, the Winthrop Yacht Club and the Point Shirley Yacht Club, towards the cost of the desired improvement, a contract was entered into on May 22, 1911, with the Eastern Dredging Company, for dredging the shoals in the Winthrop channel and for dredging a new channel at Point Shirley, the excavation in the Winthrop channel to be to a depth of 8 feet at mean low water and at Point Shirley to be to a depth of 6 feet at mean low water. The contract prices were 28.7 cents per cubic yard, scow measurement, for dredging in Winthrop harbor, and 26.3 cents per cubic yard, scow measurement, for dredging at Point Shirley.

All of the work was completed Oct. 16, 1911, material to the amount of 25,062 cubic yards having been dredged from the Winthrop channel and 4,134 cubic yards at Point Shirley, at a total cost, including supervision and incidental expenses, of \$8,501.26.

The amount expended during the year is \$7,213.20.

The total amount expended for the improvement of Winthrop harbor to Dec. 1, 1911, is \$16,416.57.

WITCHMERE HARBOR.

Petitions of the selectmen of the town of Harwich, and others, for further improvement of Witchmere harbor, presented Feb. 21, 1910, and Feb. 16, 1911. This harbor, located

at Harwichport, has been improved by the Commonwealth by the construction of jetties and by dredging, the first work having been done in 1899.

Appropriations:—

Chapter 96, Resolves of 1899 (including East Bay and Lewis Bay),	\$1,500	88.04
Chapter 91, Resolves of 1904,	3,500	
Chapter 441, Acts of 1906,	10,000	
By the town of Harwich, . 1904	500	
Chapter 119, Resolves of 1908,	3,000	
<hr/>		
Total,	\$18,500	

The total amount expended to Dec. 1, 1909, was \$22,622.02, of which a portion was paid from the appropriation for the survey and improvement of harbors.

Upon an examination made early in 1911 it appeared that seaweed had been driven by the sea over the top of the inner portion of the jetty at the harbor entrance to such an extent as to obstruct navigation in the entrance channel, and a concrete superstructure about 2 feet in height was subsequently built along the top of the jetty for a length of 260 feet at a cost, including supervision and incidental expenses, of \$814.20.

A hearing has been held on the petition presented Feb. 16, 1911, but no further action has been taken.

The amount expended during the year is \$796.70.

The total amount expended to Dec. 1, 1911, is \$23,418.72.

Action has been taken in relation to other localities, under authority of chapter 481 of the Acts of 1909, as follows:—

BASS RIVER, YARMOUTH.

Petition of Charles H. Davis, and others, for further improvement of Bass River in the towns of Dennis and Yarmouth, presented Feb. 23, 1910. The improvement of this river by the Commonwealth has been confined to its entrance channel where two jetties originally of piles and timber were built, and a channel between them across the flats was dredged, this work being completed in 1902.

Subsequently further dredging was done and the jetties were protected in part with stone, the total amount expended to Dec. 1, 1910, being \$47,471.72.

In the spring of 1911 these jetties were examined and it was found that the westerly one, which had not been reinforced with stone, had been badly eaten by sea worms so that the planks were practically cut off and the tide was flowing through the jetty. As a preventive measure it was concluded to preserve the jetty, and maintain a channel, by placing riprap throughout its entire length, and on March 31, 1911, a contract was entered into with William Sears and James H. Connolly to repair this jetty by placing the necessary stone riprap. The work was completed Aug. 1, 1911, at a total cost, including supervision and incidental expenses, of \$5,088.88. Both jetties are now thoroughly protected so that sea worms cannot do any further damage, but it will not be many years before the timber of the upper portion will be so decayed that the jetties will require further repairs.

Appropriations, 1901-1909, \$47,500.

The amount expended during the year is \$5,088.88.

The total amount expended to Dec. 1, 1911, is \$52,560.60.

CENTREVILLE RIVER.

Petition of Chester Bearse, and others, for an opening through the beach opposite Bumps River, between Centreville and Osterville, in the town of Barnstable, presented Feb. 14, 1910.

As stated in the report of the Board for 1910, it was concluded to adopt a project for dredging Centreville River instead of one for making an opening through the beach as petitioned for. A contribution of \$1,500 having been made by private parties towards the cost of the work, a contract was entered into on Sept. 28, 1910, with John H. Gerrish to do the required dredging, the contract price being \$7,200. All of the work was completed April 22, 1911, a channel 75 feet wide on the bottom and 5 feet deep at mean low water having been dredged from the existing channel in East Bay to within a few feet of the bridge crossing this river in front of the premises of Thomas Gaff. The total cost of this work, including supervision and incidental expenses, was \$7,603.22.

See plan of Cotuit harbor.

The amount expended during the year is \$5,308.52.

The total amount expended to Dec. 1, 1911, is \$7,603.22.

COTUIT HARBOR.

Petition of William H. Irwin, and others, for improvement of the entrance to Cotuit harbor, presented Feb. 2, 1910.

As stated in the report for 1910, a contract was entered into on July 25, 1910, with the Bay State Dredging Company to dredge the channel across the bars at the entrance to the harbor so that it shall be 200 feet wide on the bottom and not less than 6 feet deep at mean low water, the entrance channel being in two sections, the inner one being about 700 feet long and the outer one about 3,000 feet, the basin between the two sections being about 1,000 feet across, with a depth of 6 to 10 feet at mean low water. The contract price was \$22,500.

All of the work was completed Jan. 1, 1911, at a total cost, including supervision and incidental expenses, of \$23,199.13. There being a small balance left from the allotment, it was decided to expend it in dredging two shoals or bars in the channel near Bluff or Codmans Point. This work was completed May 4, 1911, at a cost, including supervision and incidental expenses, of \$4,166.61, making the total cost of the whole improvement \$27,365.74, of which \$2,000 was contributed by citizens of Cotuit, \$15,000 was appropriated by special acts of the Legislature, and the balance paid from the appropriation for the improvement of rivers and harbors. At the time the original contract was made for dredging the outer entrance channel, considerable doubt was expressed as to whether it would remain for any great length of time. The outer portion of the channel was completed during the summer of 1910, and a survey made in October, 1911, shows that it had maintained its full width and depth up to that time.

A plan of Cotuit harbor accompanies this report.

Appropriations 1904-1909, \$20,000.

The amount expended during the year is \$13,317.07.

The total amount expended to Dec. 1, 1911, is \$30,443.74.

C O T U I T

PLAN OF

DECEMBER 1911

SCALE 1:20000



FEET

Frank M. Hrydow CHIEF ENGINEER

O S T E R V I L L E

CENTERVILLE

W I A N N C

COCKAYNE, BOSTON

EAST BAY AND WEST BAY, OSTERVILLE.

The greatest depth of water in East Bay before improvement was about 4 feet, and the area having a depth exceeding 2 feet at mean low water was about 9 acres.

In 1903 and 1904 a channel was excavated through the beach into Nantucket Sound, two stone jetties were built, the banks of the cut through the beach protected with stone riprap, and the old outlet through the shifting sand beach was closed. Dredging and other work was done during 1905, 1908 and 1909.

Appropriations for East Bay:—

Chapter 96, Resolves of 1899 (including Witchmere harbor and Lewis Bay),	\$1,500
Chapter 376, Acts of 1903,	6,500
Chapter 115, Resolves of 1908,	10,000
<hr/>	
Total,	\$18,000

The total amount expended for the improvement of East Bay to Dec. 1, 1909, was \$18,874.58. ✓

The improvement of West Bay was commenced in 1898 and up to 1907 a channel had been excavated through the beach between this bay and Nantucket Sound, and pile and timber jetties built.

In 1907 the Board was directed to improve the entrance to this bay by removing the existing westerly jetty and building a stone one farther west; by strengthening and improving the easterly jetty, and by dredging the channel between the jetties and in the bay. This work was subsequently done under a contract made in 1907.

Appropriations for West Bay:—

Chapter 483, Acts of 1897,	\$8,500
Chapter 440, Acts of 1898,	7,500
Chapter 491, Acts of 1902.	7,500
Chapter 523, Acts of 1907.	10,000
<hr/>	
Total,	\$33,500

The total amount expended for the improvement of West Bay to Dec. 1, 1909, was \$39,507.02, of which a portion was

paid from the appropriation for the survey and improvement of harbors.

In April, 1911, an inspection was made of the jetties at both East Bay and West Bay. It appeared that the beach had built out to the outer end of the westerly stone jetty at East Bay, and that the outer end of the jetty, which was composed of comparatively small stones, had been levelled down to a considerable extent so that the sea was driving the sand from the beach into the channel. In order to protect the channel it was decided to repair and extend this jetty.

It was found that the timber work of the easterly jetty at West Bay had been eaten away and weakened to such an extent by the action of sea worms and by decay that many of the planks had been washed out and the sea was driving the beach sand into the channel, shoaling it to such an extent that it was liable to interfere with the use of the entrance. It was decided to reconstruct this jetty with stone extending from the crest of the beach to within about 100 feet of the outer end of the timber jetty.

On May 31, 1911, a contract was entered into with E. S. Belden & Sons for doing the required work at East Bay and West Bay, the contract prices being \$2.73 per ton for stone furnished and placed in the jetties, and \$11 each for the iron clamps used to secure the stones forming the jetty head. Stone to the amount of 1,406.4 tons was placed in the East Bay jetty and 2,121.9 tons in the West Bay jetty. All of the work was completed Aug. 23, 1911.

The total cost, including supervision and incidental expenses, was for the East Bay work, \$4,062.96 and for the West Bay work, \$5,916.43.

See plan of Cotuit harbor.

The amount expended at East Bay during the year is \$4,062.96.

The total amount expended at East Bay to Dec. 1, 1911, is \$22,937.54.

The amount expended at West Bay during the year is \$5,916.43.

The total amount expended at West Bay to Dec. 1, 1911, is \$45,423.45.

HOUGHS NECK, QUINCY.

Petition of the Quincy Yacht Club, and others, for dredging an anchorage basin near the mouth of Weymouth Fore River, at Houghs Neck, in Quincy, presented Feb. 24, 1910.

In April, 1911, a survey was made for the purpose of estimating the cost of the desired improvement, and a contribution of \$500 having been made by private parties toward the cost of the work, a contract was entered into on July 26, 1911, with the Bay State Dredging Company, Ltd., to dredge near the mouth of Weymouth Fore River an anchorage basin about 300 feet long, 250 feet wide, and 6 feet deep at mean low water, adjoining the steamboat landing and opposite the club house of the Quincy Yacht Club.

The contract price was 28.9 cents per cubic yard, measured in scows. All of the work was practically completed Nov. 23, 1911, at a cost, including supervision and incidental expenses, of about \$5,000.

The amount expended during the year is \$4,089.20, which is also the total expenditure to Dec. 1, 1911.

IPSWICH RIVER.

Petition of the selectmen of the town of Ipswich for further improvement of Ipswich River, presented April 13, 1910.

This river was dredged in 1906, 1907 and 1908, under appropriations made in these years, the total amount expended to Dec. 1, 1908, being \$11,188.56.

An examination made in 1911 showed that a bar extended across the mouth of the river, through which a channel had previously been excavated by the Board. A portion of this bar had been reformed by the shifting of the sand shortly after the channel was excavated. A project was adopted for improving the mouth of the river by means of a stone jetty built on the southwesterly side of the river mouth to prevent the sea from washing the material into the river, thereby allowing the current to cut and maintain a channel through the bar.

The town of Ipswich appropriated \$1,000 as a contribution towards the cost of the desired improvement, and on April 14, 1911, a contract was entered into with Thomas Fitzgibbon to

build a stone jetty on the southerly side of the mouth of this river, and extending from the shore a distance of about 160 feet below high water mark. The contract price is \$2.43 per ton for furnishing stone and depositing it in place in the jetty.

This work is now in progress. Up to Dec. 1, 1911, 750 tons of stone have been placed in this jetty.

The amount expended during the year is \$1,792.76.

The total amount expended to Dec. 1, 1911, is \$13,183.07.

LAKE ANTHONY.

Petition of Lewis Bragg, and others, for further improvement of Lake Anthony in the town of Oak Bluffs, presented Jan. 12, 1910.

This harbor is largely used as an anchorage basin for yachts and fishing craft, and also as a harbor of refuge.

The total expenditure by the Commonwealth up to Dec. 1, 1904, for excavating a channel through the beach into the lake, by building two stone jetties, dredging in the lake, and for other work, was \$30,518.08.

An examination of this harbor made in March, 1910, disclosed that the action of the sea had worn away the beach on each side of the jetties to such an extent that it was liable to break through into the channel, and also sand had been washed by the sea through the joints between the stones of the jetties and had shoaled the entrance to a considerable extent.

In March, 1911, the town voted to appropriate \$2,000 as a contribution toward the cost of the desired improvement, and this amount was subsequently paid into the State treasury.

On March 31, 1911, a contract was entered into with John H. Gerrish to strengthen the outer ends of the jetties with quarry grout and to protect their inner ends by a concrete sea wall and stone riprap, to redredge the entrance channel, from the outer end of the jetties westerly a distance of 400 feet to a width of 100 feet on the bottom and not less than 7 feet deep at mean low water; also to remove certain shoals which had formed in the anchorage basin of the harbor.

The contract prices were as follows: for dredging and disposing of the material, \$4,485; for furnishing and depositing stone for jetties and for riprap, \$2.45 per ton; for furnishing materials for and building concrete walls, \$6.45 per cubic

yard; for certain work in connection with the lantern supports on the south jetty, \$45; for furnishing and setting each iron clamp required, \$14.50. All the work was practically completed at the end of the year at a total cost, including supervision and incidental expenses, of \$10,036.56.

A plan of Lake Anthony accompanies this report.

The amount expended during the year is \$7,803.79.

The total amount expended to Dec. 1, 1911, is ~~\$44,405.25~~ *44,196.94*

LOBSTER COVE.

Petition of Geo. A. Ricker, and others, for further improvement of Lobster Cove in the city of Gloucester, presented to the Board March 18, 1910.

This cove is tributary to Annisquam River, and a channel 50 feet wide on the bottom and 6 feet deep at mean low water, extending from the channel of said river near the house of the Annisquam Yacht Club to a point in this cove opposite Fish Market wharf, was dredged in 1909, under authority of chapter 131 of the Resolves of that year, which appropriated \$2,500 for the work. The petition presented as above was for the dredging of an anchorage basin 6 feet deep at mean low water, extending beyond the work done in 1909.

A survey was made and an estimate of cost prepared for dredging an anchorage basin and widening the channel connecting the basin with the main channel of Annisquam River.

The city of Gloucester appropriated \$1,500 in aid of this project.

On Nov. 18, 1910, a contract was entered into with J. P. O'Riorden, to dredge an anchorage basin about 268,000 square feet in area in this cove, and to widen the channel about 500 feet in length, connecting this anchorage basin with the main channel of Annisquam River, all dredging to be to the depth of 6 feet at mean low water.

All of the work under this contract was completed July 14, 1911, at a total cost, including supervision and incidental expenses, of \$16,622.75.

See plan of Annisquam River.

The amount expended during the year is \$17,532.25.¹

The total amount expended to Dec. 1, 1911, is \$84,357.48.¹

¹ This includes amount expended at Annisquam and Mill Rivers.

OLD HARBOR.

Petition of Patrick H. O'Connor, and others, for further improvement of Old Harbor in Dorchester Bay, presented June 10, 1910.

On Nov. 18, 1910, a contract was entered into with the Eastern Dredging Company to excavate an anchorage basin in Old Harbor off the southerly shore of South Boston near the club house of the Mosquito Fleet Yacht Club, to 6 feet at mean low water, within an area about 1,000 feet long and 600 feet wide; also to excavate to 7 feet at mean low water a portion of the channel leading to this basin within an area about 1,800 feet long and varying in width from 50 feet to 275 feet. The amount of material to be removed was estimated to be about 96,000 cubic yards, scow measurement, in the anchorage basin, and 22,000 cubic yards, scow measurement, in the entrance channel. The contract prices were $21\frac{9}{10}$ cents per cubic yard for dredging the anchorage basin, and $28\frac{1}{10}$ cents per cubic yard for dredging the entrance channel.

This work was carried on during the winter of 1910-1911, but was suspended in May, 1911, in order that there might not be any interference with the use of this basin by boats. Work is now in progress, and it is anticipated that this improvement will be completed during the winter of 1911-1912. Up to Dec. 1, 1911, excavation has been made to the amount of 79,657 cubic yards.

The amount expended during the year is \$17,042.02.

The total amount expended in this locality to Dec. 1, 1911, is \$117,568.29.

PAMET RIVER.

Petition of the selectmen of the town of Truro, and others, for dredging Pamet River in the town of Truro, presented Feb. 15, 1911. Hearing has been held on this petition. No further action has been taken.

ROCK HARBOR.

Petition of A. T. Newcomb, and others, for further improvement of Rock harbor, in the town of Orleans, presented Feb. 9, 1910.

Hearings have been held on this petition. No further action has been taken.

The total amount expended for the improvement of this harbor to Dec. 1, 1911, is \$5,196.06.

ROCKPORT HARBOR.

Petition of John H. Dennis, and others, for further improvement of Rockport harbor, in the town of Rockport, presented March 2, 1910.

An examination of this harbor has been made, and hearing held on this petition. No further action has been taken.

The total amount expended for the improvement of this harbor to Dec. 1, 1911, is \$7,319.70.

SCORTON HARBOR.

Petition of F. R. Holway, and others, for further improvement of Scorton harbor in the town of Sandwich, presented Sept. 16, 1910.

This harbor is formed by Scorton River, a small stream in the northwesterly portion of the town of Sandwich emptying into Massachusetts Bay. Work at this place was commenced in 1898, under authority of chapter 442 of the Acts of that year, by excavating a new outlet for this river through the beach. This was followed by dredging and the building of a short jetty of granite quarry grout, and other work, making a total expenditure to Dec. 1, 1908, of \$12,916.65 under authority of said chapter 442 and chapter 516 of the Acts of 1907.

It appeared from an examination made in October, 1910, that the channel was maintaining itself fairly well, but there was a tendency towards cutting away the easterly bank and the cutting of a new channel on the east side of the jetty built at the outer end of the channel.

A contribution of \$500 having been made by private parties desirous of further improvement of this harbor, a contract was entered into on May 12, 1911, with William Sears and James H. Connolly to extend the stone jetty from the jetty-head, already in place at the outer end of the channel, along the bank of the channel to the high sandy ridges of the original beach.

The contract price for furnishing stone and depositing it in place in the jetty was \$3.10 per ton.

All of the work was completed on Sept. 10, 1911, the total cost, including supervision and incidentals, being \$4,808.84.

The amount expended during the year is \$4,806.34.

The total amount expended to Dec. 1, 1911, is \$17,774.34.

TAUNTON RIVER.

Petition of the Taunton Board of Trade, and others, for the improvement of Taunton River, presented Feb. 23, 1910.

In September and October, 1910, a survey was made of a portion of this river lying between the wharves at Dighton and Church's wharf, a distance of about 7,000 feet, this being the section which the captains of the towboats plying on the river said was most seriously obstructed. The channel was found to be narrow and crooked, and obstructed by rocks and shoals. While this survey was in progress the United States engineers were engaged in making a survey of the whole river from Taunton to Somerset bridge. It was suggested that by co-operating with the Government the desired improvement could be carried out to better advantage.

Two projects for improving the section of the river immediately above Dighton were prepared and forwarded to the United States engineer officer at Newport. One provided for dredging seven shoals, amounting in all to 17,292 cubic yards.

The other project was for excavating five shoals, as indicated on the second plan.

This matter is under consideration.

The amount expended during the year is \$112.50.

The total amount expended to Dec. 1, 1911, is \$410.62.

Surveys and estimates have been made, under authority of chapter 481 of the Acts of 1909, and contributions by municipal authorities and others, allotments and expenditures, appear in the following table: —

APPROPRIATION FOR IMPROVEMENT OF RIVERS AND HARBORS UNDER
CHAPTER 481 OF THE ACTS OF 1909.

PROJECTS.	Allotment.	Contribution by Municipality or Others.	Total Cost.	Expended in 1910 and 1911.
<i>Where Work has been done or contracted for.</i>				
✓ Annisquam River and Lobster Cove,	\$16,166 46	\$1,500 00	\$17,666 46	\$17,666 46
Bass River, Yarmouth,	5,088 88	-	5,088 88	5,088 88 ✓
Bucks Creek, Chatham,	9,443 51	1,000 00	10,443 51	10,443 51 ✓
Centreville River in Barnstable, and East Bay in Osterville.	10,166 18	1,500 00	11,666 18	11,666 18
Cohasset Harbor,	30,000 00	18,568 43	50,691 93	48,568 48
Connecticut River, Hadley,	7,484 82	500 00	7,984 82	7,984 82
Cotuit Harbor,	10,796 29	2,000 00	12,796 29	12,796 29
✓ Cuttyhunk Harbor, Gosnold,	871 14	-	871 14	871 14
✓ Deacon's Pond, Falmouth,	8,140 61	2,000 00	10,140 61	10,140 61
✓ Herring River, Harwich,	239 93	-	239 93	239 93
✓ Hingham Harbor,	3,180 69	-	3,180 69	3,180 69
✓ Houghs Neck, Quincy,	4,500 00	500 00	5,000 00	4,089 20
✓ Ipswich River,	4,000 00	1,000 00	5,000 00	1,994 51
✓ Lake Anthony, Oak Bluffs,	X 7,997 71	2,000 00	9,997 71	8,012 10
✓ Lynn Harbor,	1,843 27	200 00	2,043 27	2,043 27
✓ Manchester Harbor,	9,970 28	6,000 00	15,970 28	15,970 28
✓ Menamsha Inlet in Gay Head and Chilmark.	10,997 08	700 00	11,697 08	11,697 08
✓ North River, Marshfield,	3,079 61	1,800 00	4,879 61	3,819 88
✓ Old Harbor, southerly shore of South Boston.	28,000 00	-	28,000 00	17,328 33
✓ Scorton Harbor, East Sandwich,	4,357 69	500 00	4,857 69	4,857 69 ✓
✓ Sesuit Harbor, Dennis,	9,226 10	1,000 00	10,226 10	10,226 10 ✓
✓ West Bay, Osterville,	5,916 43	-	5,916 43	5,916 43 ✓
✓ Winthrop Harbor and Point Shirley,	7,801 28	700 00	8,501 26	7,213 20 ✓
Witchmere Harbor,	796 70	-	796 70	796 70 ✓
<i>Where Surveys and Investigations have been made.</i>				
✓ Harbor Cove, Gloucester,	179 57	-	-	179 57
✓ Paskamansett River, South Dartmouth,	95 20	-	-	95 20 ✓
Sippican Harbor, Marion,	7 17	-	-	7 17 ✓
Stony Beach, Hull,	107 90	-	-	107 90 ✓
Taunton River,	410 62	-	-	410 62 ✓
✓ Wild Harbor, Falmouth,	7 14	-	-	7 14 ✓
Advertising,	89 42	-	-	89 42 ✓
Totals,	\$200,961 66	\$41,468 43	\$243,656 57	\$223,508 78

ANNISQUAM RIVER.

This river flows into Ipswich Bay on the northerly side of the city of Gloucester, and extends southerly across Cape Ann, one of its branches extending nearly into Gloucester harbor.

Before improvement by the Commonwealth there was 7 feet at mean low water over the bar at the outlet of the river, and the channel, not less than 6 feet deep at mean low water, extended as far as Wolf Hill, about $1\frac{1}{2}$ miles from Gloucester harbor at the "Cut," so called.

The project for improvement adopted in 1904 provided for dredging a channel 50 feet wide and 6 feet deep at mean low water from Gloucester harbor to Wolf Hill. This work was completed in 1907. Further dredging was done in this river, the same being completed in November, 1909.

The total amount expended to Dec. 1, 1909, including the improvement of Lobster Cove under an appropriation of \$2,500 made in 1909, was \$65,707.19.

During the summer of 1911 a resurvey was made of that portion of the river previously dredged by the Commonwealth, which disclosed that the channel had maintained its full depth and width except that at a point about midway between the railroad and highway bridges a shoal had formed across the channel having a depth over it of only about $5\frac{1}{2}$ feet at mean low water. This shoal was formed by sand brought in from a creek which empties into the main channel at this point. Around the curve at Wolf Hill the channel had shifted somewhat and become slightly narrower than it was when dredged, although it maintains its full depth.

The United States Lighthouse Department has marked the channel of this river during the past summer with nine pile dolphins that mark not only the channel dredged by the Commonwealth but the natural channel down to a point opposite Wheelers Point.

A plan of Annisquam River accompanies this report.

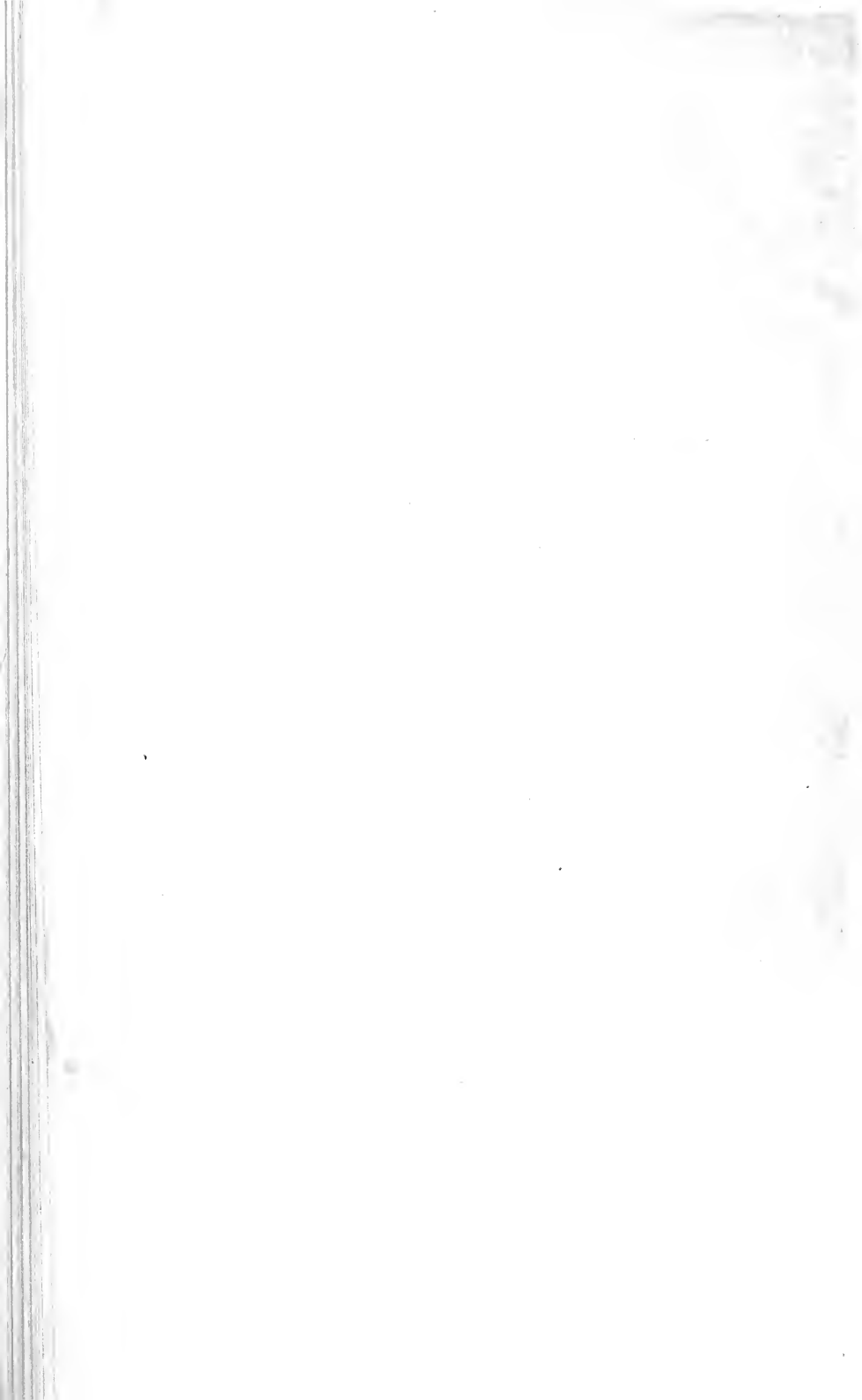
The amount expended during the year is \$17,532.25.¹

The total amount expended to Dec. 1, 1911, is \$84,357.48.¹

¹ This includes amount expended at Lobster Cove and Mill River.

Annisquam River	5398.81
Lobster Cove	11688.09
Mill River	445.35
	<hr/>
	17532.25





BACK BAY LANDS.

In December, 1910, attention was called to an alleged violation of the restrictions in the deed of the Commonwealth of certain land on Commonwealth Avenue, in respect to a balcony on the front of a house which had been erected on this land. After an examination of the premises and notice to the owner, the structure complained of was removed.

BELLE ISLE INLET.

On Feb. 15, 1911, the Board filed its report, in response to an order of the House of Representatives adopted Jan. 19, 1911, for an investigation and report relative to existing conditions in Belle Isle Inlet. This report was printed as House, No. 1549.

The amount expended was \$191.83, which was paid from the regular appropriation for engineers and other assistance.

CAPE COD CANAL.

Under the provisions of chapter 448 of the Acts of 1899, incorporating the Boston, Cape Cod & New York Canal Company, the Board of Railroad Commissioners and the Board of Harbor and Land Commissioners were constituted a Joint Board for the purposes defined in said act. The act of 1899 was amended by chapter 476 of the Acts of 1900. Additional legislation is contained in chapter 519 of the Acts of 1910.

Statements covering previous proceedings before this Board and the Joint Board, and action taken on the several petitions presented, are contained in the reports of the Board for the years 1907, pp. 98-104; 1909, pp. 17-19; 1910, pp. 34-38.

On Jan. 27, 1911, hearings were held on two petitions of the Canal Company, filed Dec. 19 and 22, 1910, respectively, for approval of a supplemental agreement between the Canal Company and the Cape Cod Construction Company and for a determination of what bridge or bridges, ferry or ferries across the canal, or tunnel or tunnels under the same, should be built at points in and near the villages of Sagamore and Bournedale, in the town of Bourne, designated by the County Commissioners of Barnstable County Dec. 5, 1910.

On Feb. 10, 1911, an order was passed approving a supplemental agreement between the Canal Company and the Cape Cod Construction Company, authorizing the Canal Company to extend the time within which the Construction Company shall complete the canal to June 3, 1912. No further action has been taken during the year on the petition relating to crossings at Sagamore and Bournedale.

On Feb. 10, June 9 and Sept. 27, 1911, orders were passed certifying and approving the issue by the Canal Company of stock and bonds aggregating 6,890 shares of stock and \$690,000 in bonds, making authorization to Dec. 1, 1911, of a total of 21,070 shares of stock of the par value of \$100 each, and \$2,110,000 in bonds.

These orders in relation to stock and bonds were issued in accordance with the requirements of chapter 448 of the Acts of 1899, as amended by chapter 476 of the Acts of 1900, and upon requisition of the Cape Cod Construction Company to the Boston, Cape Cod & New York Canal Company for the amounts of stock and bonds of said Canal Company under and in accordance with the contract between said Canal Company and said Construction Company, dated March 27, 1907, accompanied by estimates made by the chief engineer of the Canal Company as to the amount of work done and expenditures made, which had previously been examined and verified by the Joint Board and its engineer.

On July 26, 1911, the Harbor and Land Commissioners granted a permit to the Canal Company to dump an additional amount of 1,500,000 cubic yards of material dredged from the canal and its approaches, in Buzzards Bay within the dumping ground located about one mile west of the entrance to West Falmouth harbor, this dumping ground having been previously designated by the district engineer officer of the United States stationed at Newport, R. I.

On Sept. 13, 1911, a permit was granted by the Harbor and Land Commissioners to the Canal Company to dump material dredged from Monument River in a cove near the mouth of said river.

On Nov. 1, 1911, a petition of the Canal Company was presented to the Harbor and Land Commissioners for an amend-

ment of the permit granted to said Company June 13, 1910, in respect to the depositing of dredged material at the dumping ground in Buzzards Bay between Abiel's Ledge and Dry Ledge. No action has been taken on this petition.

Progress on the canal during the year 1911 is shown by the following statement furnished by the Canal Company:—

Work on the Sandwich Breakwater was carried on from March to December, and at the end of the year was more than three-fourths completed. The side slope on the north was practically finished for the entire length of nearly 3,000 feet. The principal work remaining to be done consists of placing facing stones on the southerly slope toward the canal. Large blocks have been placed to the finished top grade for almost the entire length and width.

From the easterly entrance of the canal dredging has been carried westward, and the entire prism has been excavated for the first 2 miles. The hydraulic dredge "General Mackenzie" is now working at the head of the cut westward of the Sagamore road crossing, making an advance of about 30 feet per day, while a dipper dredge is making full section 1,000 feet astern.

Work of riprapping the canal banks to protect the slopes from erosion, between high and low water marks, was started during the summer and approximately 1 mile of bank has been protected.

A temporary drawbridge has been constructed at Sagamore to serve until the permanent canal crossing at that point can be made.

Material excavated by the hydraulic dredge has been deposited along the banks of the canal, while material from the dipper dredge is being taken to sea and dumped.

Between Bournedale and Sagamore a steam shovel has been at work since July excavating dry material in the summit cut, while another shovel is similarly employed between Bournedale and Bourne.

At the westerly entrance, the 5-mile channel in Buzzards Bay is two-thirds completed, and there is a continuous channel of 20 feet depth for the first 3 miles, with a 15-foot channel as far as the mouth of the Monument River. Three dipper dredges and a ladder dredge have been employed during the past season in the approach channel. In the Monument River a hydraulic dredge has excavated a 15-foot channel from the mouth eastward to the new railroad bridge, and is now working eastward from the latter point, material from this dredge being deposited ashore on available low territory, while all spoil from the Buzzards Bay channel dredges is taken to the prescribed dumping grounds in the bay.

Work of reconstructing the Old Colony Division of the New York, New Haven & Hartford Railroad where it crosses the canal lines has been carried on throughout the year and is now completed with the

exception of stations at Bourne and Bournedale. At Bournedale 1 mile of new track was constructed and over 2 miles at Buzzards Bay, including the necessary rearranging of highways to avoid grade crossings, and the substitutes for those discontinued. On November 12 connection was made with the Woods Hole Branch Railroad line at Buzzards Bay and at Gray Gables and trains operated over the new track, the old line being cut. The pile bridge across the Monument River was subsequently removed. As soon as the necessary rearranging can be made in the Buzzards Bay yard and for the stations at Bourne and Bournedale, the entire relocated line can be operated and the old line discontinued. Work of making the necessary track and signal changes in the Buzzards Bay junction yard is now under way.

A steel highway bridge with trestle approach over the canal location and earthwork embankments connecting with the State road on the north and the Falmouth road on the south was completed during the year at Bourne. This bridge takes the place of the old Shore Road crossing at Buzzards Bay and the Bridge Street crossing in Bourne. The track of the New Bedford & Onset Street Railway Company was removed from Bridge Street in Bourne and relaid across the new bridge in July. The approaches to the bridge were macadamized in accordance with State highway specifications for similar roads in the vicinity. The south approach crosses the relocated railroad line on a reinforced concrete bridge.

In addition to this and the highways reconstructed in connection with railroad work, work is under way on such road work as will be necessary to give continuous highway from the present terminus of the State road east of Bourne village to Bournedale on the north side of the canal, in order to provide a route for traffic after the various existing road crossings are cut by the canal.

The canal is about 45 per cent. completed.

ESSEX BRIDGE.

In July, 1911, the Board, acting under the provisions of chapter 100 of the Resolves of 1911, designated Samuel M. Mansfield as a member of the Joint Board to investigate questions arising as to the Essex bridge between Salem and Beverly.

HINGHAM HARBOR.

By chapter 125 of the Resolves of 1909, the sum of \$5,000 was appropriated, in addition to \$5,000 appropriated in 1908, for dredging in this harbor. The town of Hingham was authorized to appropriate \$3,000 and pay the same into the State treasury, to be expended under the direction of this Board for

the purpose of aiding the Commonwealth in carrying out the work provided for in the resolve. This amount having been paid by the town and an agreement having been made with the United States engineer officer in charge of river and harbor work in this district to dredge the outer portion of the channel in this harbor as far as the government appropriation would allow, a contract was entered into on Sept. 28, 1910, with Charles M. Cole, to dredge an anchorage basin to the depth of 6 feet at mean low water, and a channel 75 feet wide and 6 feet deep at mean low water to connect this basin with the channel to be dredged by the United States; also, to widen about 500 feet in length of the channel which is to be dredged by the United States 50 feet wide, so that the whole channel shall be 75 feet wide and 6 feet deep at mean low water to the anchorage basin.

This work was completed May 12, 1911, at a total cost of \$16,180.69, including supervision and incidental expenses.

The amount expended during the year is \$15,965.67.

The total amount expended to Dec. 1, 1911, is \$16,180.69.

PLYMOUTH HARBOR.

The dredging of the channel in Plymouth harbor, from the "Cow Yard" to the wharf of the Plymouth Cordage Company, under chapter 531 of the Acts of 1907, and under contract with the Eastern Dredging Company dated Sept. 4, 1908, was completed March 22, 1911, at a cost, including supervision and incidental expenses, of \$142,339.09, of which one-half was paid by the town of Plymouth and one-half by the Commonwealth. A portion of this channel through the outer bar adjoining the "Cow Yard" was excavated to the depth of 20 feet at mean low water for a width of 250 feet, while the main portion of the channel was excavated to the depth of 18 feet for a width of 150 feet. While the work was in progress it was found that the current was scouring the bank on the northeasterly side of the curved portion of the channel and depositing the material in the excavated area, from which it had to be dredged and removed. This continued until practically the end of the work and resulted in making that portion of the channel nearly twice the width originally contemplated.

Owing to the low price — $16\frac{7}{10}$ cents per cubic yard, measured in scows — at which the contract was let, this increase in the size of the channel has been secured without exceeding the original estimates.

For the purpose of guiding the dredges in their work, 7 pile dolphins were driven along the southwesterly side of the curved portion of the channel. Upon the completion of the work the harbor master of Plymouth and the Plymouth Cordage Company secured permission from the United States Lighthouse Bureau to maintain these dolphins as aids to navigation.

Appropriations: —

Chapter 95, Resolves of 1906,	\$400 00
Chapter 531, Acts of 1907,	X 80,000 00 X
Chapter 319, Acts of 1911,	5,000 00
Chapter 756, Acts of 1911,	1,169 55
<hr/>	
Total,	\$86,569 55 X
	71,469.55

The amount expended during the year is \$32,369.43.

The total amount expended to Dec. 1, 1911, is \$143,744.11.

PROVINCE LANDS.

The reclamation of the territory belonging to the Commonwealth, known as the Province Lands, located in Provincetown, and containing about 3,290 acres, has been in progress under the direction of the Board since 1893. The method adopted for this work is the planting of beach grass, shrubs and trees to cover and hold the blowing sands, and has been fully described in previous reports.

During the spring season the work of brushing and the transplanting of seedling pines, pines on the sod and Scotch broom, was resumed. About 20,000 seedling pines, 2,550 pines on the sod and 3,500 hills of Scotch broom were transplanted at this time.

In the fall the work of transplanting beach grass and bayberry was resumed. Attention was first given to a portion of the area where the work of reclamation was done some years ago, and about 8 acres were covered with beach grass and bay-

berry. Subsequently about 8 acres of uncovered sand dunes were planted with beach grass and about 6 acres with bayberry, which leaves about 100 acres of sand dunes remaining for future treatment.

The sum of \$165.50 has been paid into the State treasury during the year, being the amount received from licenses which have been issued to various parties to cultivate and pick cranberries in the bogs on these lands, and to mow meadow lands.

Appropriations:—

1893-1905, inclusive, aggregate,	\$48,000
Chapter 545, Acts of 1908,	10,000
<hr/>	
Total,	\$58,000

The appropriation of \$10,000 for the reclamation of these lands, made in 1908, will expire in May, 1912.

The amount expended during the year is \$2,717.37.

The total amount expended to Dec. 1, 1911, is \$55,412.30.

· SHORT BEACH, WINTHROP.

In April, 1911, in response to an order of the Legislature relative to a sea wall built at Short Beach, in Winthrop, a report was submitted.

HANGMANS ISLAND.

On Jan. 2, 1911, Hangmans Island in Boston harbor was leased to William J. Greenfield for the term of three years from that date, the annual rental being \$50.

TOWN BOUNDARY SURVEY.

The work in this branch has been continued on the same basis and with the same organization as in previous years.

One field party has located the town corners of Adams, Cheshire, New Ashford, Hancock, Lanesborough, Pittsfield, Dalton, Hinsdale, Windsor and Cummington, completing the group of 28 towns along the northern boundary of the State, known as the "Adams group," extending from the Connecticut River to the New York line.

Another field party has very nearly completed a group of 22 towns known as the "Agawam group," extending westerly from the Connecticut River, opposite Springfield, to Peru, Middlefield and Chester, and southerly to the Connecticut line.

During the survey some remote corners have been found that were overlooked in the perambulations by the selectmen for a long period of years, a few corners have been found unmarked, and several corners are inadequately marked.

During the year the locations of 101 points marking angles in town lines, and 112 survey points, mostly on summits of hills, have been determined by triangulation.

Plane-table surveys have been made of 10 miles of rivers and streams, principally the Connecticut River, Chicopee River, and Housatonic River, and tributaries. Also a special survey, 7 miles in length, was made of the town lines following the Holyoke Mountain range, between the towns of Hadley and South Hadley, Amherst and South Hadley, and Amherst and Granby.

These surveys included 38 miles of roadway, and 12 miles of railroad.

The selectmen of the respective towns have marked with permanent stone monuments the 6 town lines which were established by the Legislature of 1911 in accordance with the recommendation of the Board under chapter 25 of the Revised Laws of 1902. In all, 29 new bounds have been set. The positions of the same were first marked on the ground by the engineers of the Board, and after the bounds were set by the selectmen they were visited and a permanent record made of their positions.

A survey of the line between Hinsdale and Peru has been made under authority of chapter 59 of the Resolves of 1911, and a plan of the line has been prepared and is now on file in this office. An examination of the statutes showed that there was some uncertainty as to the exact location of some of the bounds and angles. Most of the differences were immaterial. The main controversy arose as to the line between the two towns at the bridge crossing the brook connecting Ashmere Lake with Forwards Mill Pond, below referred to. Upon consideration of the plan and survey, the Board recommends the Legislature,

by a proper act, to establish the line between the two towns as follows, to wit:—

Beginning at a granite monument standing at the corner of the towns of Hinsdale, Peru and Windsor, in latitude $42^{\circ} 28' 48.56''$ and longitude $73^{\circ} 04' 06.21''$; thence, south $12^{\circ} 03'$ west, true bearing, 4,502 feet to a granite monument; thence, north $73^{\circ} 49'$ west, true bearing, 486 feet to a granite monument; thence, south $12^{\circ} 37'$ west, true bearing, 7,876 feet to a granite monument about 425 feet north of the house of Frank Munch in Hinsdale; thence, south $85^{\circ} 16'$ east, true bearing, 644 feet to a granite monument; thence, south $9^{\circ} 22'$ west, true bearing, 381 feet to a drill hole in a flat-top boulder embedded in the ground on the northerly side of the main road from Hinsdale to Peru; thence continuing in the same direction about 75 feet to the southerly side line of said road; thence, easterly along said southerly side line about 360 feet to a point opposite a granite monument standing on the southerly side of the road nearly opposite the house of H. Wurgler in Peru; thence, south $13^{\circ} 40'$ west, true bearing, 4,712 feet to a stone monument; thence, continuing in the same direction about 260 feet to the centre of the stream flowing from Ashmere Lake to Forwards Mill Pond; thence, following the centre line of said stream midway between its banks in a general southeasterly and southwesterly direction about 6,800 feet to a point due north of the stone monument standing on the southerly bank of said stream near its intersection with the highway leading from Hinsdale to Middlefield; thence, due south about 40 feet passing through said stone monument to the northerly side of said highway; thence, southeasterly along the northeasterly side of said highway 625 feet; thence, crossing said highway at right angles thereto to the southwesterly side line thereof; thence, southeasterly along said southwesterly side line about 625 feet to a point opposite a granite monument standing on the southerly side of said highway; thence, south $17^{\circ} 34'$ east, true bearing, 707 feet to a granite monument; thence, south $10^{\circ} 41'$ west, true bearing, 4,162 feet to a granite monument; thence, north $77^{\circ} 09'$ west, true bearing, 780 feet to a granite monument; thence, south $11^{\circ} 42'$ west, true bearing, 9,328 feet to a granite monument at the corner of the towns of Hinsdale, Peru and Washington in latitude $42^{\circ} 23' 05.37''$ and longitude $73^{\circ} 05' 30.75''$.

One atlas, describing the boundaries of 22 cities and towns, viz.: Belchertown, Brimfield, Brookfield, Chicopee, East Longmeadow, Granby, Hampden, Holland, Longmeadow, Ludlow, Monson, North Brookfield, Palmer, Southbridge, South Hadley, Springfield, Sturbridge, Wales, Ware, Warren, West

Brookfield and Wilbraham, has been prepared for publication and will be sent to the printer before Jan. 1, 1912.

Up to Dec. 1, 1911, atlases describing the boundaries of 248 cities and towns, out of a total of 354, in the Commonwealth have been completed and distributed as provided by statute. The field work for two other groups, describing the boundaries of 43 cities and towns has been completed, and that of another group relating to 22 cities and towns has been very nearly completed, and the material for these three atlases is being prepared for publication.

WEYMOUTH BACK RIVER BRIDGE.

On July 26, 1911, the members of this Board conferred with the chairman of the board of county commissioners of Norfolk County and the chairman of the board of county commissioners of Plymouth County in respect to the provisions of chapter 739 of the Acts of 1911, which authorizes the building of a new bridge across Weymouth Back River and which established a board of bridge commissioners consisting of the members of this Board and the chairman of each of the two boards of county commissioners named above, to build this structure.

On Aug. 2, 1911, the bridge commissioners inspected the present bridge now built across said river on the site of the proposed new bridge. Subsequently meetings were held, and questions relating to plans and to the powers and duties of the commissioners under the statute were discussed.

WRECKS AND OBSTRUCTIONS.

Complaints in relation to wrecks and obstructions have been received, but it has not been necessary for the Board to make any expenditure from the appropriation for their removal.

Whenever a wreck is so located that action by the United States Government, rather than by the State, seems proper, it is brought to the attention of the engineer officer in charge of the district.

Appropriation: —

Chapter 730, Acts of 1911,	\$2,000
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SALE AND DISPOSITION OF MASSACHUSETTS ATLAS SHEETS AND
TOWN BOUNDARY ATLASES.

Under authority of chapter 57, Resolves of 1890, chapter 42, Resolves of 1891, and chapter 360, Acts of 1900, 6,182 atlas sheets of the map of the Commonwealth and 4 town boundary atlases have been sold during the year, for which \$325.10 was received. Under the provisions of chapter 26, Resolves of 1909, there has been expended from this amount \$87 for the purchase from the United States Geological Survey of sheets required to keep in stock at all times copies of all the atlas sheets, leaving a balance of \$238.10, which has been forwarded to the Treasurer and Receiver-General, as required by the resolve.

It is recommended that the provisions of law relating to the sale of the Atlas sheets of the Map of the Commonwealth be repealed, as the cost to the Commonwealth of handling and selling these sheets exceeds the profits resulting from sales.

Chapter 360, Acts of 1900, as amended by chapter 484 of the Acts of 1909, directed this Board to make certain disposition of the atlases of the boundary lines of the various cities and towns in the Commonwealth. Under this authority 66 atlases have been distributed during the year.

LICENSES GRANTED DURING THE YEAR.

Nos.

3538. Petition of the Boston & Albany Railroad, the New York Central & Hudson River Railroad Company; lessee, for license to widen its bridge and extend the draw pier on Charles River, in Boston and Cambridge. Granted Dec. 12, 1910. ✓
3539. Petition of the city of Boston for license to drive piles and dredge in Boston harbor at East Boston. Granted Dec. 12, 1910. ✓
3540. Petition of the Boston Elevated Railway Company for license to build a bulkhead, sea wall and pile wharf, and to fill solid in Boston harbor near the Reserved Channel at South Boston. Granted Dec. 28, 1910. ✓
3541. Petition of Odell O. Smith for license to fill solid in Weir River, in Hull. Granted Dec. 28, 1910. ✓
3542. Petition of Thomas P. Gard for license to build a bulkhead and fill solid in Lynn harbor, in Lynn. Granted Dec. 28, 1910.

Nos.

3543. Petition of the city of Boston for license to extend North Paving wharf on piles, build a pile structure and dredge in Boston harbor, in Boston. Granted Dec. 28, 1910.
3544. Petition of Arthur C. Dunham for license to build two boat landings in Billington Sea, in Plymouth. Granted Dec. 28, 1910.
3545. Petition of the Boston & Maine Railroad for license to build a steel bridge on masonry piers and a temporary pile bridge across Saugus River, in Lynn and Saugus. Granted Jan. 2, 1911.
3546. Petition of Moses A. Packard, Thomas A. Norris and Joel Bean, trustees of the Nantasket Realty Trust, for license to build a dike and culvert, excavate a channel and fill solid in Hull Bay at Kenberma, in Hull. Granted Jan. 2, 1911.
3547. Petition of A. E. Thacher for license to build four post and timber structures in Little Mill Pond, in Chatham. Granted Jan. 4, 1911.
3548. Petition of the trustees of Weymouth Fore River bridge for license to repair the center pier of Weymouth Fore River bridge across Weymouth Fore River, in Quiney and Weymouth. Granted Jan. 6, 1911.
3549. Petition of the Boston & Maine Railroad for license to rebuild its bridge in Manchester harbor, in Manchester. Granted Jan. 6, 1911.
3550. Petition of the George Lawley & Son Corporation for license to build and maintain pile piers and marine railways, and to dredge, in Neponset River, in Boston. Granted Feb. 3, 1911.
3551. Petition of Francis W. Lawrence and Harry H. Wiggin for license to widen their wharf, on piles, and to dredge, in Mystic River, in Boston. Granted Feb. 10, 1911.
3552. Petition of the Boston & Maine Railroad for license to construct a dolphin in Annisquam River, in Gloucester. Granted Feb. 10, 1911.
3553. Petition of the Sturtevant Wharf and Storage Company for license to extend its wharf, on piles, in Boston harbor. at East Boston. Granted Feb. 15, 1911.
3554. Petition of the city of Boston for license to widen the draw-ways in Meridian Street bridge, construct fender guards and draw landings, drive piles and dredge on Chelsea Creek, in Boston and Chelsea. Granted Feb. 24, 1911.
3555. Petition of the city of New Bedford for license to build a retaining wall, fill solid, construct a power house, screens and sand catchers and lay and maintain a 60-inch pipe in Clark's Cove and Buzzards Bay at Clark's Point, in New Bedford. Granted Feb. 27, 1911.

Nos.

3556. Petition of the firm of Haas & Fenner for license to erect a building, on piles, and locate and maintain two floats in Lake Quinsigamond, in Worcester and Shrewsbury. Granted Feb. 27, 1911.
3557. Petition of Henry Walton for license to build a boat landing in Billington Sea, in Plymouth. Granted Feb. 27, 1911.
3558. Petition of Elizabeth T. Roberts for license to maintain filling, to place stone riprap and to dredge in Deacon's Pond harbor, in Falmouth. Granted Feb. 27, 1911.
3559. Petition of Henrietta F. Goodnow for license to maintain filling and riprap already done and to dredge in Deacon's Pond harbor, in Falmouth. Granted Feb. 27, 1911.
3560. Petition of Hortense M. Roach for license to build a pile wharf in Vineyard Haven harbor, in Tisbury. Granted March 6, 1911.
3561. Petition of the Old Colony Railroad Company for license to replace its present bridge by a new bridge across Cohasset Narrows, in Wareham and Bourne. Granted March 8, 1911.
3562. Petition of Eugene Carpenter for license to build a pile wharf in Vineyard Haven harbor, in Tisbury. Granted March 20, 1911.
3563. Petition of the Boston Consolidated Gas Company for license to lay and maintain an 8-inch gas main and a siphon in Tenean Creek at Commercial Point bridge, in Boston. Granted March 20, 1911.
3564. Petition of the Boston Consolidated Gas Company for license to lay and maintain an 8-inch gas main and a siphon in Neponset River at Neponset bridge, in Boston and Quincy. Granted March 20, 1911.
3565. Petition of Jessie M. Barron for license to build a pier, on piles, and two float stages in Cohasset harbor, in Cohasset. Granted March 27, 1911.
3566. Petition of the Old Colony Railroad Company for license to replace its present railroad bridge with a new bridge across Cole's River, in Swansea. Granted April 12, 1911.
3567. Petition of the Old Colony Railroad Company for license to replace its present railroad bridge with a new bridge across Lee's River, in Somerset and Swansea. Granted April 12, 1911.
3568. Petition of John J. Sommer for license to build a wharf and float stage on Weweantit River, in Marion. Granted April 12, 1911.
3569. Petition of Stephen J. Connolly, Gregory P. Connolly and Thomas D. Connolly for license to build a wharf on piles, in Manchester harbor, in Manchester. Granted April 24, 1911.

Nos.

3570. Petition of the New Bedford, Marthas Vineyard and Nantucket Steamboat Company for license to build a wall and bulkhead, to fill solid and dredge at its wharf in Nantucket harbor, in Nantucket. Granted April 24, 1911.
3571. Petition of the town of Barnstable for license to replace the Grand Island bridge across West Bay with a new bridge at Osterville, in Barnstable. Granted April 26, 1911.
3572. Petition of Harriet G. Curry for license to build a pier, sea wall, float, two dolphins, and to fill solid, in Kettle Cove, in Gloucester. Granted May 1, 1911.
3573. Petition of F. Apthorp Foster for license to extend his wharf, on piles, in Edgartown harbor, in Edgartown. Granted May 3, 1911.
- ✓ 3574. Petition of the city of Boston for license to rebuild the fender piers of Neponset bridge on Neponset River, in Boston and Quincy. Granted May 3, 1911.
3575. Petition of the Booth Manufacturing Company for license to build a sea wall and bulkheads, drive fender piles and fill solid in Acushnet River on the easterly side of Clark's Point, in New Bedford. Granted May 3, 1911.
3576. Petition of the Nantasket Beach Steamboat Company for license to drive fender piles at its Pemberton pier in Hull Bay, in Hull. Granted May 5, 1911.
3577. Petition of Alphonse M. Joly for license to build a sea wall and fill solid in Palmers Cove, in Salem. Granted May 5, 1911.
- ✓ 3578. Petition of the Alger Land Trust for license to fill solid in South Bay westerly of Dorchester Avenue, in Boston. Granted May 5, 1911.
3579. Petition of the city of New Bedford for license to extend the Merrimac Street sewer on a pile and timber foundation in Acushnet River, in New Bedford. Granted May 5, 1911.
3580. Petition of the Union Street Railway Company for license to build a sea wall and fill solid in Acushnet River at Popes Island, in New Bedford. Granted May 5, 1911.
3581. Petition of the Philadelphia & Reading Coal and Iron Company for license to fill flats in Salem harbor adjoining the Pennsylvania pier, in Salem. Granted May 10, 1911.
3582. Petition of Carlton H. Lee for license to build a pile pier in Pleasant Bay at Strong Island, in Chatham. Granted May 15, 1911.
3583. Petition of the J. M. Guffey Petroleum Company for license to locate and maintain a float in Beverly harbor, in Beverly. Granted May 15, 1911.
3584. Petition of the Staples Coal Company for license to build a sea wall and fill solid in a dock on Taunton River, in Taunton. Granted May 15, 1911.

Nos.

- ✓ 3585. Petition of the Pleasant Park Yacht Club for license to build and maintain a club house, on piles, and a float, on Belle Isle Inlet, in Winthrop. Granted May 17, 1911.
- 3586. Petition of the Sprague, Breed & Brown Company for license to rebuild and extend its wharf, on piles, and to dredge in Beverly harbor, in Beverly. Granted May 19, 1911.
- 3587. Petition of the New Bedford Gas & Edison Light Company for license to lay a 6-inch gas main in Acushnet River near Coggeshall Street bridge, in New Bedford and Fairhaven. Granted May 19, 1911.
- 3588. Petition of the Fall River Gas Works Company for license to lay and maintain a 6-inch gas main in and across Taunton Great River, in Fall River and Somerset. Granted May 19, 1911.
- ✓ 3589. Petition of the city of Boston for license to extend the fender guard of Northern Avenue bridge on Fort Point Channel, in Boston. Granted May 19, 1911.
- ✓ 3590. Petition of the county commissioners of the county of Norfolk and the trustees of Weymouth Fore River bridge for approval of plans for repairing the present bridge over Weymouth Fore River, and widening the draw therein, in Quiney and Weymouth, under authority of chapter 230, Acts of 1911. Granted May 31, 1911.
- ✓ 3591. Petition of the city of Boston for license to widen the southerly channel of Meridian Street bridge, build a new draw, and reconstruct portions of said bridge, on piles, on Chelsea Creek, in Boston and Chelsea. Granted May 31, 1911.
- ✓ 3592. Petition of Thomas J. Vallee for license to build a pile pier and two floats on Weymouth Fore River, in Weymouth. Granted June 5, 1911.
- 3593. Petition of Samuel D. Goodenough for license to build and maintain a wharf and float in West Falmouth harbor, in Falmouth. Granted June 7, 1911.
- 3594. Petition of Edward W. Clark for license to build a pier and float in Marblehead harbor, in Marblehead. Granted June 16, 1911.
- 3595. Petition of the town of Falmouth for license to build a sea wall and fill solid in Woods Hole Great Harbor at Woods Hole, in Falmouth. Granted June 23, 1911.
- ✓ 3596. Petition of the Cochrane Chemical Company for license to build bulkheads, dikes and pile wharf, to fill solid and dredge, on Mystic River, in Everett. Granted June 23, 1911.
- ✓ 3597. Petition of George J. Bicknell for license to maintain a pile pier and floats in Hull Bay at Bayside, in Hull. Granted June 26, 1911.

Nos.

- ✓ 3598. Petition of Hugh F. Marston for license to build a bulkhead and fill solid in Hull Bay near Nantasket Avenue, in Hull. Granted June 26, 1911.
3599. Petition of the city of Worcester for license to build and maintain a crib and float in Lake Quinsigamond, in Worcester. Granted June 26, 1911.
- ✓ 3600. Petition of the Boston & Maine Railroad for license to build a pile platform, fill flats and maintain filling done on Mystic River, in Somerville. Granted June 30, 1911.
3601. Petition of Jean B. Jean and Stanislas Desautels, trustees, for license to build a pile bulkhead and fill solid on Acushnet River, in New Bedford. Granted July 6, 1911.
3602. Petition of Eliza T. Howes for license to build a stone jetty in Sesuit harbor, in Dennis. Granted July 17, 1911.
- ✓ 3603. Petition of the Boston Cold Storage and Terminal Company for license to build a sea wall and pile wharf and to fill solid in Boston harbor, at East Boston. Granted July 17, 1911.
3604. Petition of Alton H. Griffith and E. Lloyd Griffith for license to excavate a canal, build a flume, lay a pipe and draw water from Sampson's Pond, in Carver. Granted July 26, 1911.
3605. Petition of Waldo E. Forbes and Edward W. Forbes for license to build a stone breakwater in Buzzards Bay at the entrance to Nashawena harbor, in Gosnold. Granted Aug. 2, 1911.
- ✓ 3606. Petition of the Boston and Houghs Neck Steamboat Company for license to build a pile wharf in Weymouth Fore River at Houghs Neck, in Quincy. Granted Aug. 2, 1911.
3607. Petition of Andrew H. Bearse for license to build a marine railway in Stage Harbor, in Chatham. Granted Aug. 2, 1911.
3608. Petition of Alfred L. Lincoln for license to construct a stone riprap wall in North River, in Marshfield. Granted Aug. 2, 1911.
3609. Petition of the Sealshipt Oyster System for license to extend its wharf on piles, build a bulkhead and fill solid in Wellfleet harbor, in Wellfleet. Granted Sept. 6, 1911.
3610. Petition of the city of New Bedford for license to build pile structures across the head of the dock at Union Street and between piers 2 and 3 of city wharves on Acushnet River, in New Bedford. Granted Sept. 6, 1911.
- ✓ 3611. Petition of the Peter Bent Brigham Hospital for license to build a bulkhead and pile platform and to fill solid in South Bay, in Boston. Granted Sept. 6, 1911.
3612. Petition of Tarr and Wonson, Ltd., for license to build a sea wall and fill solid in Gloucester harbor at Rocky Neck, in Gloucester. Granted Sept. 13, 1911.

Nos.

3613. Petition of the Taunton-New Bedford Copper Company for license to build a pile and timber coffer-dam and crib, lay a 12-inch cast iron pipe and fill solid and dredge on Acushnet River, in New Bedford. Granted Oct. 3, 1911.
3614. Petition of the city of New Bedford for license to build a sea wall and pile wharf, to fill solid and dredge, in Clark's Cove at Clark's Point, in New Bedford. Granted Oct. 3, 1911.
3615. Petition of Louis Collier for license to build a sea wall and fill solid in Salem harbor, in Salem. Granted Oct. 11, 1911.
3616. Petition of Walter L. Dean for license to build a sea wall and three stone piers and to fill solid, in Smith's Cove, in Gloucester. Granted Oct. 11, 1911.
3617. Petition of the Brockton & Plymouth Street Railway Company for license to build a boat landing in Little Sandy Bottom Pond, in Pembroke. Granted Oct. 11, 1911.
3618. Petition of the Merrimac Hat Company for license to build a pile wharf and pile dolphins and to dredge on Merrimac River, in Amesbury. Granted Oct. 11, 1911.
3619. Petition of Jesse J. Coburn for license to build and maintain a boathouse and two floats in and over Tyng's Pond, in Dracut. Granted Oct. 11, 1911.
3620. Petition of John B. Osborn for license to build and maintain a pile pier in Edgartown harbor, in Edgartown. Granted Oct. 11, 1911.
3621. Petition of the Brett Lumber Company for license to build a bulkhead and pile platform, fill solid and dredge, on Saugus River, in Lynn. Granted Oct. 16, 1911.
- ✓ 3622. Petition of the trustees of the American Buildings Trust for license to build structures, fill solid and dredge in Boston harbor on the Reserved Channel at South Boston. Granted Oct. 25, 1911.
3623. Petition of the Automatic Telephone Company for license to lay a submarine cable in a dredged trench in Acushnet River at Coggeshall Street bridge, in New Bedford and Fairhaven. Granted Oct. 25, 1911.
3624. Petition of the West Realty Company for license to extend its wharf on Merrimac River, in Haverhill. Granted Oct. 25, 1911.
3625. Petition of Huybertie Pruyn Hamlin for license to build a stone pier, maintain a float and to dredge in Buzzards Bay, in Mattapoisett. Granted Nov. 13, 1911.
3626. Petition of Willard Welsh for license to build a sea wall and fill solid in Little Harbor, in Marblehead. Granted Nov. 13, 1911.

Nos.

3627. Petition of William A. Publicover for license to build a pile wharf in Gloucester harbor at East Gloucester, in Gloucester. Granted Nov. 13, 1911.
3628. Petition of Charles B. Harlow for license to build an ice-run on piles in Fresh Pond, in Plymouth. Granted Nov. 22, 1911.
3629. Petition of James T. Hennessy and Leslie B. Handy for license to excavate a ditch, build structures and draw water from Mary's Pond, in Rochester. Granted Nov. 22, 1911.
3630. Petition of the Salem Water Board for license to build pile and timber structures in Wenham Lake, in Beverly. Granted Nov. 29, 1911.

MISCELLANEOUS PERMITS GRANTED DURING THE YEAR.

- THE GEORGE LAWLEY & SON CORPORATION, to dredge in Neponset River. Granted Dec. 7, 1910.
- LAKE GROVE CEMETERY ASSOCIATION, to use and occupy Grape Island in Lake Winthrop, in Holliston. Granted Dec. 19, 1910.
- SAVIN HILL YACHT CLUB, to dredge in Dorchester Bay at Savin Hill. Granted Dec. 21, 1910.
- CAPT. JAMES P. PARKER, to dredge a berth adjoining the "gas house wharf" in Boston harbor. Granted Dec. 23, 1910.
- ELLEN M. BOARDMAN, to remove gravel from Salters Beach, in Plymouth. Granted Jan. 9, 1911.
- JOSEPH E. CAHILL, to dump on the Commonwealth flats, at South Boston, material taken in the city of Boston. Granted Jan. 11, 1911.
- WILLIAM P. WHARTON, to use and occupy Grassy Island in Badda-cook Pond, in Groton. Granted Jan. 18, 1911.
- JAMES F. DOOLEY, to dump on the Commonwealth flats, at South Boston, material taken in the city of Boston. Granted Jan. 23, 1911.
- JEREMIAH P. O'RIORDEN, to dump on the Commonwealth flats at South Boston, material taken in the city of Boston. Granted Jan. 30, 1911.
- THE FIRM OF SOLEY & BLAIR, to dump snow from Dover Street bridge into tide water, in Boston. Granted Jan. 30, 1911.
- F. E. HILL, to erect a building on the Province Lands near Blackwater Pond, in Provincetown. Granted Feb. 13, 1911.
- GEORGE R. LANE, Jr., to remove sand from Little Good Harbor Beach, in Gloucester. Granted Feb. 15, 1911.
- FRANK J. HANNON, to use for storage purposes a portion of the sea wall and filled land of the Commonwealth northerly of the Reserved Channel, at South Boston. Granted March 1, 1911.
- J. P. O'RIORDEN, to use for storage purposes a portion of the sea wall and filled land of the Commonwealth northerly of the Reserved Channel, at South Boston. Granted March 1, 1911.

- W. H. STURGIS, to take gravel from the beach at Allerton, in Hull. Granted March 1, 1911.
- SAMUEL HAMMOND, to remove gravel from Willow Beach or from the beach on the Lynn harbor side of Bass Point, in Nahant. Granted March 6, 1911.
- FRANK OSCAR SWINSON, to remove sand from Little Good Harbor Beach, in Gloucester. Granted March 8, 1911.
- OTTO SCHNEIDER, to excavate and remove material from shore lots at Houghs Neck, in Quincy. Granted March 10, 1911.
- FRANK ROSE, to use and occupy quarantine rock, in Boston harbor. Granted March 10, 1911.
- JOSEPH GAHM & SON, to dump ashes on the Commonwealth flats, at South Boston. Granted April 3, 1911.
- THE GODFREY COAL COMPANY, to dredge in Neponset River, in Milton, and to dump the dredged material upon the Neponset River Reservation. Granted April 4, 1911.
- FORE RIVER SHIPBUILDING COMPANY, to dredge in Weymouth Fore River, in Quincy. Granted April 5, 1911.
- D. W. DUNN & Co., to dump ashes on the Commonwealth flats, at South Boston. Granted April 13, 1911.
- PROPRIETORS OF BOSTON PIER or the LONG WHARF, to dredge in the dock between Long Wharf and Central Wharf, in Boston. Granted April 14, 1911.
- NEW BEDFORD YACHT CLUB, to fasten a small housing to the breakwater built by the Commonwealth in Apponagansett harbor. Granted April 24, 1911.
- HINGHAM YACHT CLUB, to dredge in Hingham harbor, in Hingham. Granted April 26, 1911.
- EDWIN B. HOLMES, to dredge a channel and basin in Hull Bay, in Hull. Granted April 28, 1911.
- HENRY HORNBLOWER, to remove stones from Eel River and from the beach in Plymouth. Granted May 3, 1911.
- N. WEBSTER DAY, to remove sand from Little Good Harbor Beach, in Gloucester. Granted May 3, 1911.
- EDISON ELECTRIC ILLUMINATING COMPANY OF BOSTON, to dredge in Boston harbor near the Reserved Channel, at South Boston. Granted May 8, 1911.
- CATHERINE A. BAIRD, to remove stones from the beach on Weymouth Fore River at Great Hill, in Quincy. Granted May 8, 1911.
- WALDO E. FORBES AND EDWARD W. FORBES, to dredge in Nashawena harbor. Granted May 12, 1911.
- BAY STATE DREDGING COMPANY, Ltd., to dump dredged material in tide water northerly of the Breakwater Construction Company's breakwater, in Gloucester. Granted May 19, 1911.

- NANTASKET BEACH STEAMBOAT COMPANY, to remove accumulations of sand in and around Pemberton pier, in Hull. Granted May 19, 1911.
- EASTERN DREDGING COMPANY, to dredge material in Boston harbor between Gallop's Island and Nix's Mate. Granted May 31, 1911.
- EASTERN DREDGING COMPANY, to dredge gravel from Great Brewster Spit in Boston harbor. Granted May 31, 1911.
- EASTERN DREDGING COMPANY, to dredge material from Broad Sound southerly of Great Fawn Beacon, in Boston harbor. Granted May 31, 1911.
- FREDERIC D. FISK, JOSEPH SARGENT AND ROBERT F. FISK, trustees, to dredge material from their flats in Charles River on the Cambridge side of the channel, near Cambridge bridge. Granted May 31, 1911.
- BAY STATE DREDGING COMPANY, Ltd., to dredge a berth at the steamboat wharf in Provincetown harbor. Granted June 5, 1911.
- CITY OF NEW BEDFORD, to dredge material in certain docks in New Bedford. Granted June 5, 1911.
- EMPIRE SAND AND GRAVEL COMPANY, to dredge sand in Merrimac River, Ipswich River and Cape Cod Bay. Granted June 7, 1911.
- BETHEL BEACH REAL ESTATE TRUST, to dump sand on Bethel Beach, in Quincy, near Rock Island Cove. Granted June 12, 1911.
- KATHERINE BEACH THOMSON, to deposit sand on her beach in Plymouth harbor. Granted June 16, 1911.
- TOWN OF MARBLEHEAD, to locate and maintain a float for swimming purposes in Marblehead harbor at Crocker Park. Granted June 16, 1911.
- PROVINCETOWN COLD STORAGE COMPANY, to dredge a berth and channel in Provincetown harbor. Granted June 16, 1911.
- SAMUEL HAMMOND, to remove gravel from beaches in Nahant. Extension of time granted June 16, 1911.
- BAY STATE DREDGING COMPANY, Ltd., to dump dredged material in Salem harbor. Granted June 26, 1911.
- JOHN C. SPRING, to dredge a channel in Essex Bay, in Gloucester. Granted July 6, 1911.
- WALDO FARRAR, to erect telephone poles in Wareham and Marion. Granted July 14, 1911.
- BAY STATE DREDGING COMPANY, Ltd., to dump dredged material on the Neponset River Reservation, in conformity with a permit from the Metropolitan Park Commission. Granted July 17, 1911.
- BOSTON, CAPE COD & NEW YORK CANAL COMPANY, to dump dredged material in Buzzards Bay, westerly of West Falmouth harbor. Granted July 26, 1911.
- TOWN OF MANCHESTER, to dredge in Manchester harbor. Granted July 26, 1911.

DENISON BROTHERS COMPANY, to dredge a berth and channel in Acushnet River, in New Bedford. Granted Aug. 2, 1911.

THE BROWN-WALES COMPANY, to use for storage purposes a portion of the Commonwealth's land at South Boston. Granted Aug. 9, 1911.

TOWN OF BOURNE, to remove material from Pocasset harbor, at Pocasset. Granted Sept. 6, 1911.

IRVING C. HAMMOND AND FREDERICK F. PRIOR, to dredge in Onset Bay, in Onset. Granted Sept. 13, 1911.

BOSTON, CAPE COD & NEW YORK CANAL COMPANY, to deposit dredged material in a cove near the mouth of Monument River. Granted Sept. 13, 1911.

P. E. SAVILLE, to remove stones from the beach at Point Shirley, in Winthrop. Granted Sept. 13, 1911.

B. R. CHAPMAN, to erect a building on the Province Lands near Blackwater Pond, in Provincetown. Granted Sept. 20, 1911.

VALENTINE BARTSCH, to remove stone from the beach at Point Shirley, in Winthrop. Granted Oct. 4, 1911.

CHARLES H. TRAISER, to remove material from the beach at Clifton, in Marblehead. Granted Oct. 11, 1911.

BERT W. GOVE, to remove sand and stones from the beach near Emerald Street, in Nahant. Granted Nov. 13, 1911.

WORK OF THE UNITED STATES IN RIVERS AND HARBORS OF THE COMMONWEALTH.

The Board is indebted to Col. Frederic V. Abbot, Corps of Engineers, U. S. A., who is in charge of river and harbor improvements in eastern and southern Massachusetts, for the following statements, which show the work accomplished in the rivers and harbors of the Commonwealth during the fiscal year ending June 30, 1911:—

STATEMENT OF COL. FREDERIC V. ABBOT, CORPS OF ENGINEERS, U. S. A.

BOSTON, MASS., NOV. 13, 1911.

Board of Harbor and Land Commissioners, Commonwealth of Massachusetts, State House, Boston, Mass.

SIRS:—In accordance with your request of the 6th instant, I have the honor to furnish the following summary of work accomplished by the United States during the fiscal year ending June 30, 1911, upon the improvement of rivers and harbors in Massachusetts under the charge of this office:

Newburyport Harbor.

Thirteen thousand four hundred and seventy tons of rubblestone were deposited in the north jetty, completing a core to the required height of 12 feet above mean low water for 200 feet, to the height of 9 feet above mean low water for a distance of 100 feet, and to mean low water level for a further distance of 325 feet.

Merrimac River.

The only work done was during the last ten days of the fiscal year, in which time 181 cubic yards of material were dredged from the channel above Rocks bridge and 229 cubic yards below the bridge.

Harbor of Refuge, Sandy Bay, Cape Ann.

Superstructure construction was continued during the year. At the close of the year a total length of 197.6 feet of superstructure had been completed on the southern arm, and 110.6 feet on the western arm.

Gloucester Harbor.

As a protection to the breakwater 1,353 tons of rubblestone were deposited along the front of the seaward wall of the superstructure. A survey of ledges with a view to their removal was also made.

Lynn Harbor.

The removal of a shoal about 4,500 feet long, along the western side of the inner channel was practically accomplished, 218,670 cubic yards being dredged; and in maintenance of the channel completed in 1908 4,748 cubic yards were dredged.

Mystic River Below Mouth of Island End River.

The dredging of the 25-foot channel below Chelsea bridge was completed in February, 1911, by the removal of 55,853 cubic yards of mud, sand and clay in conjunction with dredging the 35-foot channel of Boston harbor.

Two hundred twenty-six thousand, nine hundred and twenty-four cubic yards of material were dredged in enlarging by dredging to 30-foot depth the entrance to the channel leading to Mystic Wharf, and in obtaining a channel 30 feet deep at mean low water and approximately 300 feet wide from Chelsea bridge to just above the mouth of Island End River, except a section about 300 feet long and 35 feet wide just above Chelsea bridge where ledge was found above grade.

Boston Harbor.

Seawalls.—Repairs were made to the seawalls on Lovells Island, Great Brewster Island, and Georges Island, and to the riprap beach

protection at Lovells Island; the protection at Lovells Island was extended around the southeast end for about 1,300 feet; and at Long Island Head riprap was placed in front of the sea wall for a distance of 731 feet.

Twenty-seven-foot Channel.—Twenty points of loose broken rock were removed from the improved channel in the upper harbor.

Thirty-five-foot Channel.—The dredging accomplished during the fiscal year, as well as the dredging under this project to June 30, 1911, is shown in the following table:—

	WORK DONE IN FISCAL YEAR 1911.				ALL WORK DONE TO JUNE 30, 1911.		
	DREDGING.		BOULDERS.		Dredg- ing (Cubic Yards).	Bould- ers (Cubic Yards).	Remarks.
	Cubic Yards.	Price (Cents).	Cubic Yards.	Price (Dol- lars).			
Division 1, Section 1, .	29,965	20.0	-	-	1,978,896	-	Completed.
Division 1, Section 1a, .	-	39.0	-	-	611,483	-	Completed.
Division 2, Section 2, .	-	23.4	-	-	1,898,880	11.310	Completed.
Division 2, Section 2a, .	3,927	40.0	-	-	578,772	-	Completed.
Division 3, Section 3, .	11,176	23.5	-	-	1,705,320	-	
Division 3, Section 3a, .	1,324	39.0	-	-	451,194	83.888	Completed.
Division 4, Section 4, .	-	23.9	-	-	1,878,636.5	7.332	Completed.
Division 4, Section 4a, .	5,101	39.7	-	-	460,463	31.870	Completed.
Division 5, Section 5, .	665,538	22.0	-	-	2,218,813	-	
Division 5, Section 5a, .	48,494	40.0	-	-	620,555	-	
Division 6, Section 6, .	338,790	22.0	-	-	2,437,380	-	
Division 6, Section 6a, .	95,943	40.0	-	-	619,063	-	
Division 7, Section 7, .	232,644	22.0	-	-	2,202,439	5.000	
Division 7, Section 7a, .	197,202	40.0	9.898	24	601,908	9.898	
Division 8, Section 8, .	1,151,164	22.0	-	-	1,668,562	-	
Division 8, Section 8a, .	192,466	40.0	39.111	24	677,469	48.616	
Total, . . .	2,973,734	-	49.009	-	20,609,833.5	197.914	

NOTE.—Sections 1, 2, 3, 4, 5, 6, 7 and 8 are above President Roads; sections 1a, 2a, 3a, 4a, 5a, 6a, 7a and 8a are in Broad Sound.

Hingham Harbor.

A channel 100 feet wide and 8 feet deep at mean low water was dredged from deep water near the head of the harbor to the steamboat wharf, a distance of about 2,000 feet, and was continued for a further distance of about 500 feet with a width of 50 feet and depth of 6 feet; a total of 23,771 cubic yards having been dredged.

Plymouth Harbor.

In repair of 2,133 feet of the riprap dike 3,990 tons of stone were deposited.

Provincetown Harbor.

Five thousand nine hundred thirty-eight tons of stone were deposited in the dike being built across House Point Island flats.

Removal of Wrecks.

The removal of the wreck of barge "City of Montreal" from Plymouth harbor, work on which was commenced in the previous fiscal year, was completed.

The wreck of barge "Harbeson Hickman," which sank in Plymouth harbor in November or December, 1909, was removed.

The wreck of the schooner "Nat Ayer," on the southeasterly shore of Deer Island, Boston harbor, was removed, as it was liable to be driven by storms into the channels of the harbor, where it would become a serious menace to navigation.

A contract for the removal of the five-masted schooner "Davis Palmer," which foundered on Dec. 26, 1909, in Broad Sound, at the entrance to the 35-foot channel, Boston harbor, was let, and the work of removal was in progress at the close of the fiscal year.

Very respectfully,

FREDERIC V. ABBOT,
Colonel, Corps of Engineers.

Statement of work done by the United States on rivers and harbors of Massachusetts under the Newport, R. I., engineer office during the fiscal year ending June 30, 1911:—

Hyannis Harbor.

No works of improvement were in progress during the fiscal year.

Nantucket Harbor.

A contract was entered into with the Coastwise Dredging Company of Norfolk, Va., under date of Jan. 31, 1911, for dredging a channel 17 feet deep and 100 feet wide between the jetties, extending from the 17-foot contour outside the bar to the same depth in the harbor, the work to be completed by Sept. 25, 1911. Price, 19.9 cents per cubic yard, scow measurement. Work under this contract was commenced May 8, 1911, and was in progress at the close of the fiscal year, up to which time 110,841 cubic yards had been removed. The work was done by a suction dredge of light draft towed through the channel.

Woods Hole Channel.

The sweeping of the channel in progress at the close of the last fiscal year developed a large number of shoal spots in both the main channel and the Broadway Channel, apparently consisting of boulders

rolled into the former channels by the violent tidal currents due to the difference of tidal levels at the two ends of this short narrow opening between Buzzards Bay and Vineyard Sound. Four of these points had a depth of from 9 to 9.5 feet of water over them. These were the shoalest points found. They were all removed under a contract with Charles E. Davis of New Bedford, Mass., for the hire of lighter and crew including diving outfit and diver with necessary hoisting apparatus at the rate of \$69 per day, full time to be paid for unless time is lost by reason of insufficient crew, breakdown of machinery or lack of supplies. Proposals were invited, to be opened July 25, 1911, for the removal of the remainder of the shoal spots lacking from 1 to 2 feet of the required depth.

New Bedford and Fairhaven Harbors.

A survey of the ledge rock at the junction of the approach channel with the anchorage area near the north end of Palmers Island was completed, showing the existence of 2,429.4 cubic yards of rock above the projected plane of the bottom of the anchorage area, 25 feet below the mean low water level. The shoalest point on this rock is 15.5 feet. Proposals were invited, to be opened July 11, 1911, for dredging in these harbors.

Taunton River.

A survey of the river was made from Weir bridge to Dighton showing a few shoal places in the channel.

Fall River Harbor.

The work during the past fiscal year has been dredging with the United States dredge "Gedney." From the beginning of the last fiscal year until August 8 the work was that of maintenance. Since that time it has been under the project of June 25, 1910, for extending the 25-foot deep anchorage area. The amount of material dredged was

For maintenance,	.	.	.	.	.	36,951 cubic yards
For improvement,	.	.	.	.	.	236,187 cubic yards
						<hr/>
Total,	.	.	.	.	.	273,138 cubic yards

Removal of Wrecks.

The following wrecks were removed so as no longer to form obstructions to navigation:—

The schooner "Mary Farron" (Farrow) of Bangor, Me., was sunk in 36 feet of water about 2½ miles west by south from the Handkerchief Shoal Light Vessel. The work of removal was commenced August 22 and completed Aug. 31, 1910.

The gasoline yacht "Senta" burned and sunk in the inner harbor at Edgartown. The work of removal was commenced May 1 and completed May 7, 1911.

The schooner "Belle Halliday" of Philadelphia was sunk 1 mile west of Pollock Rip Shoal Light Vessel, and in consequence of the temporary transfer of the diver, Mr. McMahan, in charge of the wrecking force of the Newport office, to work on the removal of the battleship "Maine" from Havana harbor, this wreck was, on the request of the chief of engineers, destroyed by the United States Revenue Cutter "Seneca."

The survey of the locality of the proposed direct channel through the Monomoy Shoals at the eastern entrance to Nantucket Sound, with a view to determining the cost and advisability of the removal of the northerly portion of Stone Horse Shoal and of such portions of Bearse Shoal and Pollock Rip Shoal as may be necessary, was made.

Reports on the preliminary examination and survey of the harbors of New Bedford and Fairhaven, with a view to extending the channel to Belleville, were submitted, the former on Dec. 28, 1910, and the latter on April 21, 1911.

APPROPRIATION FOR SURVEY AND IMPROVEMENT OF HARBORS.

By chapter 730 of the Acts of 1911 an appropriation of \$3,000 was made for surveys of harbors and for improving and preserving the same, and for repairing damages occasioned by storms along the coast line or river banks of the Commonwealth.

Expenditures from this appropriation have been made to Dec. 1, 1911, in the locality and to the amount following, viz.:—

Scituate, repairing sea walls,	\$302 55
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COMMONWEALTH'S FLATS IMPROVEMENT FUND.

The balance in the Commonwealth's flats improvement fund on the first day of December, 1910, was \$1,045,893.19. To this has been added during the year \$35,954.74 from the income of the fund and \$89,734.40 from rents of lands and other sources, making a total of \$1,171,582.33. Of this sum there has been expended during the year \$377,163.36, leaving a balance on Nov. 30, 1911, of \$794,418.97.

HARBOR COMPENSATION FUND.

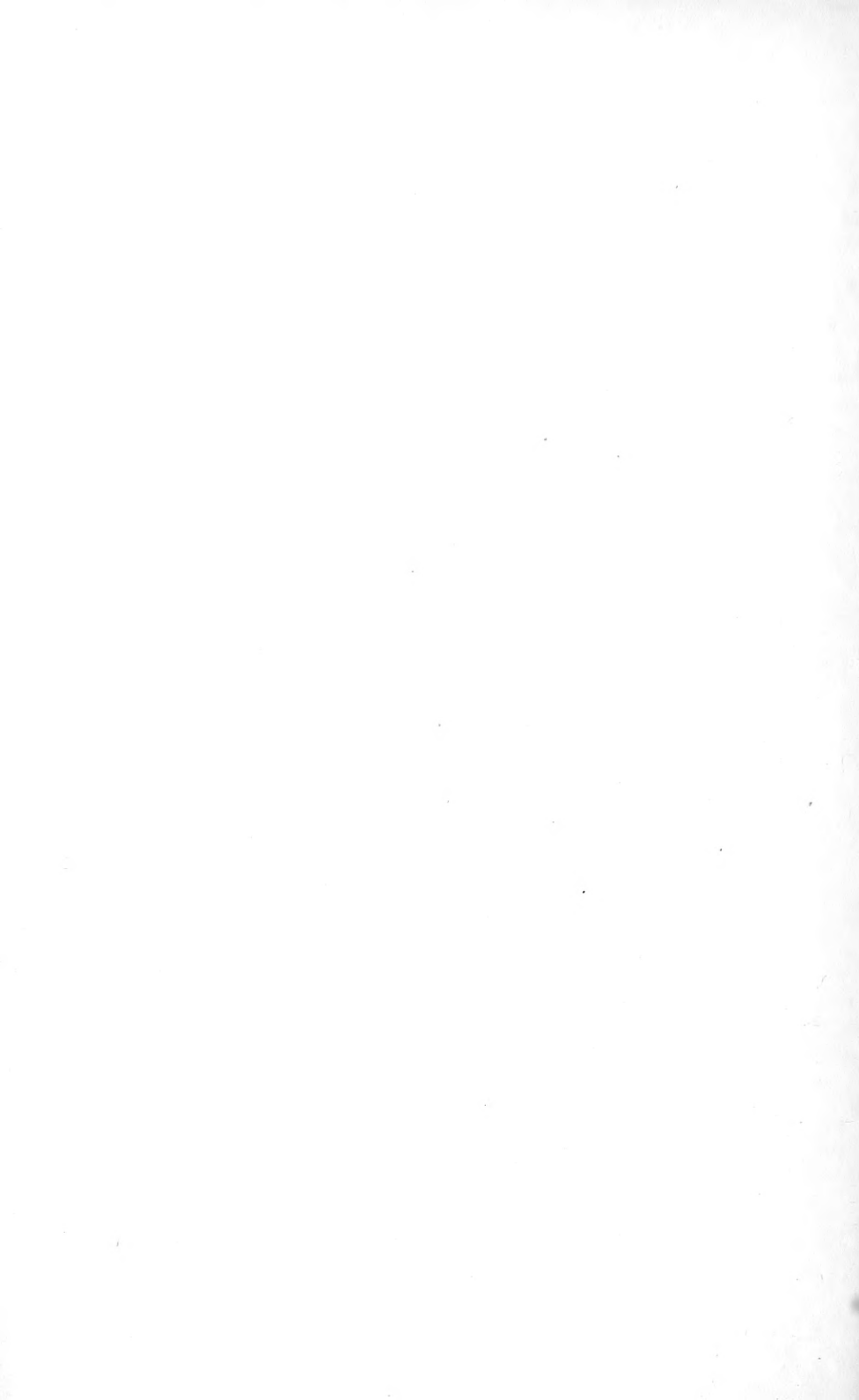
There was paid into the treasury of the Commonwealth during the year, under chapter 146 of the Acts of 1897 and chapter 96 of the Revised Laws, for tide water displaced by work done under licenses granted by the Board and for rights and privileges granted in tide waters and great ponds, the sum of \$10,054.11, which was credited to the harbor compensation fund for Boston harbor. The amount in this fund on Nov. 30, 1911, was \$631,513.06; the balance of income from this fund in the treasury on the same date was \$757.09; the total income for the year was \$24,635.78. The expenditure for dredging during the year, from the income, was \$53,765.03.

The foregoing report is respectfully submitted.

GEORGE E. SMITH,
SAMUEL M. MANSFIELD,
CHARLES C. PAINE,

Commissioners.

DEC. 1, 1911.



APPENDIX.

APPENDIX A.

APPROPRIATIONS BY THE LEGISLATURE AND EXPENDITURES FOR RIVER AND HARBOR WORK UNDER DIRECTION OF THE HARBOR AND LAND COMMISSIONERS.

Small Harbors.—From 1893 to 1911 inclusive.

LOCALITY.	Character of Work.	Total Appropriation.	Contribution by Municipality or Others.	Total Expenditure.	Approximate Balance required to complete Contract.
Allens harbor, Harwich,	Survey,	\$219 50	-	\$219 50	-
Annisquam River and Lobster Cove,	Dredging,	83,047 61	\$1,500 00	84,357 48	-
Apponagansett harbor,	Stone breakwater,	40,500 00	-	40,221 33	-
Barnstable harbor,	Survey,	217 51	-	217 51	-
Bass River, Beverly,	Dredging,	25,000 00	55,535 75	81,075 56	-
Bass River, Yarmouth,	Jetties and dredging,	52,588 88	-	52,560 60	-
Bucks Creek, Chatham,	Jetty and survey,	10,693 51	1,000 00	11,633 86	-
Cataumet harbor,	Survey,	500 00	-	356 33	-
Centerville River, Barnstable, and East Bay, Osterville,	Jetties and dredging,	27,104 57	1,500 00	30,540 76	-
Chatham,	Stone riprap,	15,000 00	-	14,968 75	-
Cohasset harbor,	Breakwater and dredging,	30,000 00	18,568 43	48,568 48	-

Small Harbors, etc. — Continued.

LOCALITY.	Character of Work.	Total Appropriation.	Contribution by Municipality or Others.	Total Expenditure.	Approximate Balance required to complete Contract.
Cornit harbor,	Dredging,	\$30,796 29	\$2,000 00	\$30,443 74	-
Cuttyhunk harbor,	Jetties and dredging,	31,874 14	5,000 00	36,330 02	-
Deacon's Pond, Falmouth,	Jetties and dredging,	33,140 61	12,000 00	45,147 61	-
Dorchester, easterly shore,	Dredging,	70,000 00	-	70,171 31	-
Essex River,	Dredging,	5,000 00	-	5,000 00	-
Green harbor,	Jetties and dredging,	90,500 00	-	76,333 26	-
Harbor Cove, Gloucester,	Survey,	179 57	-	179 57	-
Harbor View,	Dredging,	10,000 00	-	146 00	-
Herring River, Harwich,	Jetties and dredging,	20,739 93	2,000 00	22,777 08	-
Herring River, Wellfleet,	Dike and ditches,	10,000 00	10,000 00	20,815 29	-
Hingham harbor,	Dredging,	13,180 69	3,000 00	16,180 69	-
Houghs Neck, Quiney,	Dredging,	4,500 00	500 00	4,089 20	\$910 80
Hunarock Beach, Scituate,	Survey,	250 00	-	236 07	-
Improvement of rivers and harbors,	Advertising,	89 42	-	89 42	-
Ipswich River,	Dredging,	15,000 00	1,000 00	13,183 07	3,005 49
Island End River,	Survey,	264 10	-	264 10	-
Jeffries Point,	Dredging,	10,000 00	-	-	-
Lake Anthony, Oak Bluffs,	Jetties and dredging,	42,997 71	2,000 00	44,405 25	-

Lewis Bay, Hyannis,	.	.	.	.	.	Dredging,	.	.	.	16,477 21	-	17,012 22	-
Lynn harbor,	.	.	.	.	.	Dredging and survey,	.	.	.	12,843 27	200 00	12,788 05	-
Manchester harbor,	.	.	.	.	.	Dredging,	.	.	.	17,970 28	8,500 00	24,098 86	-
Menasha Inlet,	.	.	.	.	.	Jetties and dredging,	.	.	.	54,997 08	700 00	57,370 38	-
Merrimae River,	.	.	.	.	.	Investigation,	.	.	.	100 00	-	-	-
Mill River, ¹	.	.	.	.	.	Survey,	.	.	.	-	-	-	-
Nantucket harbor,	.	.	.	.	.	Dredging,	.	.	.	15,000 00	-	15,930 30	-
Neponset River,	.	.	.	.	.	Dredging,	.	.	.	34,270 44	-	34,269 70	-
North River, Marshfield,	.	.	.	.	.	Removing rocks,	.	.	.	3,079 61	1,800 00	3,319 88	1,059 73
North River, Scituate,	.	.	.	.	.	Survey,	.	.	.	119 70	-	552 47	-
Oak Bluffs, public landing,	.	.	.	.	.	Removing rocks,	.	.	.	500 00	-	462 50	-
Orient Heights,	.	.	.	.	.	Dredging,	.	.	.	8,500 00	-	8,144 52	-
Paskamansett River,	.	.	.	.	.	Dredging,	.	.	.	2,045 20	-	2,187 35	-
Penikese Island,	.	.	.	.	.	Pilo wharf and survey,	.	.	.	5,300 00	-	5,192 95	-
Plum Island River,	.	.	.	.	.	Survey,	.	.	.	983 31	-	983 31	-
Plymouth harbor,	.	.	.	.	.	Dredging,	.	.	.	86,569 55	71,169 54	143,744 11	-
Point Shirley, ²	.	.	.	.	.	Dredging,	.	.	.	-	-	-	-
Province Lands,	.	.	.	.	.	Reclamation,	.	.	.	58,000 00	-	55,412 30	-
Quansett harbor, Orleans,	.	.	.	.	.	Survey,	.	.	.	195 88	-	194 50	-
Quicks Hole,	.	.	.	.	.	Survey,	.	.	.	500 00	-	-	-
Revere,	.	.	.	.	.	Stone breakwater,	.	.	.	55,000 00	-	54,990 84	-
Rock Harbor, Orleans,	.	.	.	.	.	Dredging,	.	.	.	5,200 00	-	5,196 06	-

¹ See Annisquam River and Lobster Cove.² See Winthrop Harbor Channel.

Small Harbors, etc. — Concluded.

LOCALITY.	Character of Work.	Total Appropriation.	Contribution by Municipality or Others.	Total Expenditure.	Approximate Balance required to complete Contract.
Rockport harbor,	Removing rocks,	\$8,000 00	-	\$7,319 70	-
Saugus River,	Survey,	1,000 00	-	638 53	-
Scituate,	Sea walls and riprap,	38,300 00	-	39,621 21	-
Scorton harbor, Sandwich,	Jetty and dredging,	19,337 69	\$500 00	17,774 34	-
Sesuit harbor, Dennis,	Jetty,	19,426 10	1,000 00	20,466 30	-
Shirley Gut,	Dredging,	-	-	1,906 20	-
Sippican harbor, Marion,	Survey,	7 17	-	7 17	-
Southerly shore of South Boston,	Dredging,	128,000 00	-	117,568 29	-
South River, Salem,	Dredging,	5,000 00	3,000 00	8,097 67	-
Stage harbor, Clatham,	Dikes,	6,000 00	-	9,231 93	-
Stony Beach, Hull,	Sea wall,	11,607 90	-	11,335 07	-
Taunton River, Dighton,	Survey,	410 62	-	410 62	-
Taunton River-Boston harbor canal,	Survey,	10,000 00	-	9,932 75	-
Vineyard Haven harbor,	Stone breakwater,	30,500 00	-	30,231 86	-
Waquoit Bay,	Survey,	1,000 00	-	701 61	-
West Bay, Osterville,	Jetties and dredging,	39,416 43	-	45,423 45	-
West Falmouth harbor,	Dredging,	25,500 00	-	24,386 18	-
Weymouth Fore River,	Dredging,	37,500 00 ¹	-	24,066 70	-

Wild harbor, Falmouth,	Breakwater,	5,157 14	-	100 27	-
Winthrop harbor channel,	Dredging,	12,801 26	700 00	16,416 57	-
Winthrop harbor, Cottage Park,	Dredging,	6,525 00	-	6,581 66	-
Witchmere harbor, Harwich,	Jetties and dredging,	17,384 04 ²	500 00	23,418 72	-
Wollaston Beach, Quincy,	Dredging,	15,000 00	-	14,644 61	-
Wrecks,	Removal from tide water,	60,416 66	-	6,948 78	-
Totals,		\$1,549,395 58	\$203,673 72	\$1,620,092 33	\$4,976 02

Boston Main Harbor. — From 1870 to 1911 inclusive.

Anchorage basin,	Dredging,	\$1,002,500 00	-	\$504,268 50	-
Boston harbor,	Dredging,	165,000 00 ³	-	580,987 44	-
Commonwealth's flats at East Boston,	Harbor improvement,	3,100,000 00	-	35,084 27	-
Commonwealth's flats at South Boston,	Harbor improvement,	4,838,902 03	-	3,585,500 60	\$401,470 00
Commonwealth Pier,	Wharf and dock,	400,000 00	-	381,877 09	-
Drydock,	Investigation,	5,000 00	-	435 50	-
Metropolitan dock system,	Investigation,	1,000 00	-	644 15	-
Northern Avenue,	Bridge,	260,000 00	-	260,000 00	-
South Bay improvement fund,	Dredging,	59,437 50	-	57,341 24	-
Totals,		\$9,831,839 53	-	\$5,406,138 79	\$401,470 00

¹ From small items, \$1.15.

² From small items, \$3.64.

³ In addition, \$417,983.94 from income of harbor compensation fund.

Connecticut River. — From 1888 to 1911 inclusive.

LOCALITY.	Character of Work.	Total Appropriation.	Contribution by Municipality or Others.	Total Expenditure.	Approximate Balance required to complete Contract.
Agawam,	Bank protection,	\$13,000 00	—	\$11,430 19	—
Hadley,	Bank protection,	76,463 92	\$500 00	78,801 54	—
Hatfield,	Dikes,	7,500 00	—	6,700 75	—
Holyoke,	Dredging,	15,000 00	—	—	—
Investigation of navigation,	—	5,500 00	—	2,788 01	—
Northampton,	Bank protection,	1,500 00	—	1,524 20	—
West Springfield,	Bank protection,	5,000 00	—	5,051 49	—
Totals, . . . . .	. . . . .	\$123,963 92	\$500 00	\$106,296 18	—

Summary.

Small harbors, 1893 to 1911,	—	\$1,549,395 58	\$203,673 72	\$1,630,092 32	\$4,976 02
Boston main harbor, 1870 to 1911,	—	9,831,839 53	—	—	401,470 00
Connecticut River, 1888 to 1911,	—	123,963 92	500 00	106,296 18	—
Totals, . . . . .	. . . . .	\$11,505,199 03	\$204,173 72	\$1,736,388 51	\$406,446 02

APPENDIX B.

[See page 4 of this report, ante.]

CONTRACTS MADE AND PENDING DURING THE YEAR 1911.

Contract No.	Work.	Contractors.	Date.	To be completed.	Condition of Work.	Prices.	Amount.
92	Dredging in Plymouth harbor,	Eastern Dredging Co.,	Sept. 4, 1908	Oct. 1, 1910	Completed,	Dredging, 16.7 cents per cubic yard, scow measure; dol- phins, \$120 each.	\$135,221 65
110	Dredging at Commonwealth pier, South Boston.	Eastern Dredging Co.,	Oct. 22, 1909	May 31, 1911	Completed,	15.3 cents per cubic yard, meas- ured in scows.	73,653 75
113	Dredging channel at Cuttyhunk,	John R. Burke,	Dec. 10, 1909	June 1, 1910	Completed,	\$15,600,	21,207 44
118	Improving mouth of Bucks Creek, South Chatham.	James H. Connolly,	May 20, 1910	Oct. 1, 1910	Completed,	Excavating channel and build- ing earthen portion of dike, \$2,600. Stone in jetties and riprap, \$2.35 per ton. 14½ cents per cubic yard scow measure.	9,686 00
122	Dredging South Channel of Mystic River.	Eastern Dredging Co.,	July 1, 1910	Aug. 1, 1911	Completed,	14½ cents per cubic yard scow measure.	14,698 56
123	Dredging anchorage basin and channel, Cohasset harbor.	J. P. O'Riorden,	July 18, 1910	Aug. 1, 1911	Completed,	14½ cents per cubic yard, scow measure.	14,455 31
124	Stone breakwater at Cohasset har- bor.	Thomas Fitzgibbon,	July 18, 1910	Oct. 30, 1910	Completed,	\$2.13 per ton,	10,404 83
121	Dredging channel in Cotuit har- bor, in Barnstable.	Bay State Dredging Co.,	July 25, 1910	Dec. 1, 1911	Completed,	\$22,500,	22,500 00
125	Pier No. 6 and Northern Avenue extension.	Holbrook, Cabot & Rollins Corpn.	Sept. 23, 1910	Jan. 1, 1913	In progress,	\$760,000,	760,000 00
127	Dredging channel and anchorage basin in Hingham harbor.	Charles M. Cole,	Sept. 28, 1910	June 1, 1911	Completed,	26½ cents per cubic yard, scow measure.	15,501 97
128	Dredging channel in Centreville River, Barnstable.	John H. Gerrish,	Sept. 28, 1910	Dec. 1, 1910	Completed,	\$7,200,	7,200 00
129	Dredging South Channel of Mystic River.	Bay State Dredging Co.,	Nov. 18, 1910	Aug. 1, 1911	Completed,	18 cents per cubic yard, scow measure.	8,380 80
130	Dredging at Lobster Cove, Glou- cester.	J. P. O'Riorden,	Nov. 18, 1910	July 1, 1911	Completed,	22½ cents per cubic yard, scow measure.	16,064 43

CONTRACTS MADE AND PENDING, ETC. — *Concluded.*

Contract No.	Work.	Contractors.	Date.	To be completed.	Condition of Work.	Prices.	Amount.
131	Dredging near Mosquito Fleet Yacht Club House, South Boston.	Eastern Dredging Co., . .	Nov. 18, 1910	Dec. 1, 1911	In progress,	Excavating the anchorage basin near the Mosquito Fleet Yacht Club House, 2 1/10 cents per cubic yard, scow measure. Excavating the entrance channel, 28 3/10 cents per cubic yard, scow measure.	\$27,200 00
132	Dredging opposite Leyland Line pier, East Boston.	Daly & Hannan Dredging Company.	Mar. 31, 1911	Apr. 1, 1912	Completed,	25 cents per cubic yard, scow measure.	59,779 75
134	Improving harbor at Lake Anthony, Oak Bluffs.	John H. Gerrish, . . .	Mar. 31, 1911	Sept. 30, 1911	In progress,	Dredging, \$4.485. Quarry grout, and chips, \$2.45 per ton. Furnishing material and building sea walls, \$6.45 per cubic yard. Resetting standard, \$45. Clamps, \$14.50 each.	9,176 10
135	Riprap, Bass River, Yarmouth,	William Sears & James H. Connolly.	Mar. 31, 1911	Oct. 1, 1911	Completed,	\$2.60 per ton, . . .	4,768 40
133	Dredging Deacon's Pond harbor, Falmouth.	John R. Burke, . . .	Apr. 5, 1911	July 1, 1911	Completed,	25.9 cents per cubic yard, measured in scoops.	9,758 86
138	Jetty at mouth of Ipswich River, .	Thomas Fitzgibbon, . .	Apr. 14, 1911	Sept. 1, 1911	In progress,	\$2.43 per ton, . . .	4,800 00
137	Clearing boulders from North River, Marshfield.	Thomas Fitzgibbon, . .	Apr. 14, 1911	Sept. 30, 1911	Completed,	\$2.83 per ton, . . .	4,269 86
139	Dredging Cobasset harbor, . .	Bay State Dredging Company, Ltd.	May 5, 1911	Nov. 1, 1911	Completed,	21.9 cents per cubic yard, measured in scoops.	16,578 76
140	Dredging channel in Winthrop harbor and at Point Shirley.	Eastern Dredging Company, .	May 22, 1911	Dec. 1, 1911	Completed,	Dredging Winthrop harbor, 28.7 cents per cubic yard, scow measure. Dredging at Point Shirley, 26.3 cents per cubic yard, scow measure.	7,706 03
136	Jetty at Scorton harbor, East Sandwich.	William Sears & James H. Connolly.	May 12 1911,	Sept. 1, 1911	Completed,	\$3.10 per ton, . . .	4,718 20
141	Extending jetties at East Bay and West Bay, Osterville.	E. S. Belden & Sons, . .	May 31, 1911	Oct. 1, 1911	Completed,	Stone in jetties, \$2.73 per ton, Clamps, \$11 each.	9,753 26
142	Anchorage basin at Houghs Neck, Quincy.	Bay State Dredging Company, Ltd.	July 26, 1911	Dec. 1, 1911	In progress,	Dredging, 28.9 cents per cubic yard, scow measure.	4,600 00
143	Dredging in Manchester harbor, Manchester.	J. P. O'Riordan, . . .	July 26, 1911	Dec. 1, 1911	Completed,	26.2 cents per cubic yard, scow measure.	15,094 61

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